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(54) Title: MULTIVENUE JACKPOT SYSTEM

(57) Abstract

Multivenue jackpot system comprising a central control system (6), connecting via a communications network (4) to a jackpot controller (32) at multiple gaming venues (26). Each gaming venue (26) having multiple electronic gaming machines (28) (i.e. poker, slot, video machines) which include hard meters and a jackpot interface (56) for linking via a venue network (30) to the jackpot controller (32). The gaming machines (28) are capable of playing independent games and participating in a multiple gaming machine jackpot game. The central control system (6) increments on the basis of the hard meter signals and/or awards a jackpot sum from a jackpot pool to a selected gaming machine (28). The jackpot interface (56) is a separate circuit board capable of being fitted to a standard gaming machine (28). Jackpot award criteria include random time, predetermined levels, usage factor of gaming machine (28) and gaming venues (26).
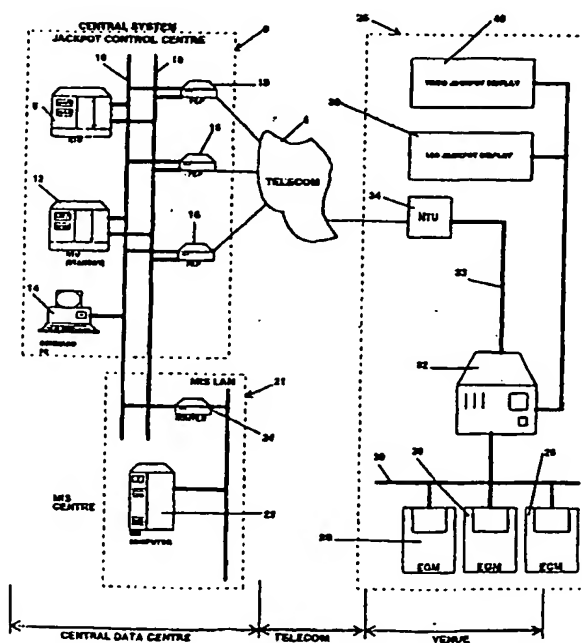
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MULTIVENUE JACKPOT SYSTEM

This invention relates to a multivenue jackpot system.

5   The object of the present invention is a multivenue jackpot system which includes a number of venues where electronic gaming machines (EGMs) are located and a central control system which is remote from and controls the EGMs.

According to the present invention there is provided a multivenue jackpot system
10 comprising a central control system and a plurality of gaming venues, each gaming venue including:

a jackpot controller coupled for communication with said central control system by way of a communications network;

a plurality of electronic gaming machines (EGMs) each including hard meters and
15 EGM logic for generating input signals for the hard meters; and

a venue network coupled to said jackpot controller;

wherein each electronic gaming machine includes a jackpot interface coupled to the electronic gaming machine and the venue network, each said jackpot interface being coupled to monitor said hard meter input signals, and said central control system including a jackpot
20 sum which is incremented and/or awarded to a selected electronic gaming machine in accordance with said input signals.

Preferably, each second interface means comprises a circuit board which can be coupled to an otherwise standard EGM.
25

The invention also provides a multivenue jackpot system comprising:

a central control system;

communications interface for coupling the central control system to a communications network;

30   a plurality of gaming venues:

each gaming venue including a jackpot controller coupled for communication with said

central control system by way of the communications network, a plurality of electronic gaming machines (EGM) each including hard meters and EGM logic for generating input signals for the hard meters, and a venue network and wherein each electronic gaming machine includes a jackpot interface for coupling the electronic gaming machine to the venue network and

5 wherein the jackpot interface is coupled to monitor said hard meter input signals and wherein the central control system establishes a jackpot which is based upon the occurrence of a random event, and upon occurrence of the random event the central control system selects a winning venue and wherein the jackpot controller at the winning venue is arranged to select a winning EGM by reference to hard meter input signals derived from the EGM logic.

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In one form, the random event may comprise the passing of a randomly selected time. In another form, the random event may be triggering of a mystery value and selecting the venue that caused the trigger.

15　　These and other novel features of the system will become apparent from the following description of examples of the invention, in which:

Figure 1 is a block diagram of an electronic gaming system of the invention;

Figure 2 is a block diagram of the venue configuration;

Figure 3 is a diagrammatic representation showing data flows at the central control

20 system;

Figure 4 is a block diagram of a jackpot interface board (JIB);

Figure 5 is a block diagram of the jackpot controller;

Figures 6 to 9 are circuit diagrams for one implementation of an IP module;

Figures 10 to 18 are block diagrams of glue logic in the IP module;

25　　Figure 19 is a flow chart showing boot loading of the jackpot interface board;

Figure 20 is a diagrammatic representation of the major process steps carried out by the central controller (JCC);

Figure 21 diagrammatically illustrates messages in the win sequence of the system; and

Figure 22 is a flow chart illustrating the major functional steps of the jackpot

30 controller.

The illustrated gaming system of the invention includes a jackpot control centre (JCC) 6 which is coupled to a wide area network (WAN) 4. The wide area network may comprise a public telephone system. The JCC 6 may include a central computer 8 which includes a real time UNIX based operating system which, generally speaking, maintains overall control of the system. The central computer 8 is coupled by first and second local area networks (LAN) 10 and 19 to a standby central computer 12, which comes into operation should there be a fault in the central computer 8. Duplicate LANs are used for greater system redundancy. The LANs 10 and 19 are also connected to a command PC 14 which can be used for input and output of instructions at a high level in the system and monitor progress jackpot applications. The JCC 6 also includes a number of front end processing (FEP) devices 15 connected to the LANs 10 and 19. The front end processing devices 15 essentially comprise high speed modems for coupling the first and second LANs 10 and 19 to the wide area network 4.

The system may also include a management information system 21 which provides management statistical and account data processing which may be carried out on an off-line basis. The management information system 21 also includes a management information system (MIS) computer 23 which operates a jackpot data base (JDB) which for instance can be implemented on INGRES data base. The computer 23 is coupled to the LANs 10 and 19 by means of a router 24. Alternatively, the computer 23 could be coupled directly to dual LANs 10 and 19.

The system includes a number of venues 26, one of which is shown in Figure 1. In practice there would be a number of venues 26 which are coupled to the JCC 6 by means of the wide area network 4. The venue 26 may comprise a casino, gambling hall or other site at which gambling is permitted by the relevant authorities. The venue includes a number of electronic gaming machines (EGMs) 28 which are coupled to a venue jackpot LAN 30. The EGMs 28 can be operated independently for gaming such as by playing poker or the like or may be connected to another network (not shown) for communications within the venue. The EGMs can also be coupled together within the venue or within a number of different venues for playing jackpot games subject to the control of the JCC 6.

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Each venue 26 includes a jackpot controller 32 which is coupled to the venue jackpot LAN 30 and to a network termination device (NTU) 34 via a bus 33. The network termination device 34 may comprise a modem and is coupled to the wide area network 4. Each of the EGMs 28 includes a jackpot interface board (JIB) 56 which provides coupling to the venue 5 jackpot LAN 30 in a manner which permits the EGMs to participate in jackpots which are applicable to a selected number of EGMs at the venue, all EGMs at the venue, or selected EGMs at different venues, as will be described below. The venue 26 includes jackpot displays 38 and 40 which are controlled by the jackpot controller 32. The display 38 may comprise one or more LED displays which are located in prominent positions at the venue to display prize 10 money and other information relating to jackpots. The display 40 may comprise video display monitors which display similar information. The displays 38 and 40 are of course different to the video displays (not shown) which form part of the EGMs 28.

Figure 2 shows in more detail an arrangement for the hardware configuration at a 15 venue. In this arrangement, the video displays 40 are driven by a video display interface 46. Similarly, the LED displays 38 are driven by LED display interfaces 48. Interfaces 46 and/or 48 may be embodied in a PC. The arrangement includes a slip printer 50 and bar code reader 52 which are coupled by means of a peripheral interface 54 to the venue jackpot LAN 30. The slip printer 50 and bar code reader 52 can be used as part of a jackpot win procedure which 20 will be described below.

In the preferred implementation of the invention, the JIBs 56 are intelligent devices which greatly facilitate linking together of the EGMs 28 to participate in a jackpot game which is subject to the control of the jackpot controller 32 as well as the JCC 6.
25

The main functions of the JCC 6 are:

1.   To configure and reconfigure jackpot controllers 32 and peripherals.
2.   To start, stop and restart jackpots.
3.   To maintain software counters for counting contributions from EGMs.
30 4.   To identify when a jackpot has been won and take appropriate action.
5.   To check the integrity of the software and hardware in the jackpot system at any time.

6.   To log information packets that are sent by the jackpot controllers 32.

7.   To issue jackpot tickets.

8.   To validate jackpot tickets.

9.   To be able to provide any information about the status of any part of the jackpot
5   system as required.

The EGMs 28 can be of standard types apart from the inclusion of the JIB board 56. EGMs normally include logic means for playing the normal games on the EGM such as poker, black jack or the like. The logic generates hard meter input signals for hard meters which are 10 provided in the EGM. The hard meters indicate such things as credit played (which is the amount of cash which has been wagered), cash out (which is the amount of cash which has been paid out by the EGM), cash in (which is the amount of cash inserted into the machine), and credit won (which is the amount of money which has been won on that machine). In the system of the invention, the JIBs 56 are responsive to the hard meter input signals and 15 communicate relevant changes to the jackpot controller 32 at the venue via the venue jackpot LAN 30. The jackpot controller 32 communicates with the JCC 6 via the network 4 so that in accordance with the invention, a jackpot game can be carried out by effectively monitoring the hard meter input signals at a number of venues. A jackpot can be configured in the JCC 6 to have a random jackpot value and a jackpot pool is established and is incremented in 20 accordance with hard meter input signals which have been generated by the various participating EGMs. When a hard meter input signal increments the jackpot pool so that it reaches or exceeds the random jackpot value, that constitutes a jackpot win and the system operates to identify the EGM which generated the hard meter input signal which generated the win.
25

An even simpler jackpot game is to make the jackpot a fixed amount and to generate a random time within a specified time frame (1 hr, 24 hrs, etc...). When that time arrives a venue is randomly selected and then the jackpot controller 32 at that venue makes the next 30 EGM to make a contribution the winner. A slightly fairer model is to randomly select the venue from a list that is weighted according to each venue's average total contribution rates

over a selected period. Again the jackpot controller 32 is notified and the next EGM to make a contribution is the winner.

Figure 4 is a block diagram showing the main functional blocks of the JIB 56. Briefly,
5 the JIB 56 carried out a variety of functions but its main function however is to enable the EGM 28 to which it is connected via hard meters to participate in a jackpot game involving a number of EGMs which are linked together at a venue 26 and at a number of venues 26. The JIB 56 monitors input signals to hard meters of the EGM via connector 120 and enables transfer of hard meter input signals to the jackpot controller 32. It also enables the jackpot
10 controller to check the status of logic seal switches, audit keys and door seals and the like which are normally provided on the EGMs 28. It also superimposes messages on the EGM display relevant to the jackpot in which the EGM is participating.

The JIB 56 comprises a microprocessor 16, a serial communications port 18, a memory
15 20 and a network interface 22. The JIB includes a system bus 78 coupled between the microprocessor 16 and the network interface 22. The network interface 22 may comprise known forms of interfaced device such as ethernet cards or the like. The network interface 22 is coupled to the venue jackpot LAN 30. Data flows between the EGM and venue jackpot LAN 30 through the interface device 22 and is formatted by the microprocessor 16 in
20 accordance with information stored in the memory 20. The memory 20 also includes software for implementation of processing steps by the microprocessor relating to jackpot implementation, data communication and video displays. The JIB 56 also includes a communications bus 29 which can enable additional serial communications.

25

The interface port also includes a video mixing device 42 which receives video in data from the EGM logic and provides video out data for the EGM display. The video mixing device 42 is coupled to the microprocessor 16 which provides a control mechanism for controlling video mixing of the video signals applied to the EGM display. The device 42 is
30 arranged to superimpose jackpot information on the normal EGM display. Alternatively, it can be arranged to blank out the normal display when the jackpot information is displayed.

Reference is made to a copending Australian patent application filed contemporaneously herewith in respect of an invention entitled "Jackpot Display System for an Electronic Gaming Machine", the content of which is incorporated herein by reference. The copending application describes an example of circuitry for the JIB 56 in greater detail.

5

Figure 5 is a block diagram of the jackpot controller 32. The jackpot controller can be implemented on a PC platform. It comprises a processor 60 which preferably comprises a Motorola MVME 162-223A which is similar in some respects to a PC designed for specific applications. The processor 60 includes a CPU 62, flash memory 64 (e.g. 1MB), DRAM
10 memory 66 (e.g. 1-4MB parity DRAM and 16-32MB ECC DRAM) and SRAM memory 68 (e.g. 128K − 2MB SRAM with battery backup). The processor 60 includes a serial port controller 70 such as an 85230 serial I/O controller, coupled to a serial port connector 74. The processor 60 also includes an ethernet controller 76 (e.g. 182596CA) coupled to a DB-15 ethernet connector 78. The processor 60 also includes a coprocessor 80, such as a 53C710
15 SCSI coprocessor, coupled to a SCSI connector 82. The processor 60 also includes two IP ports 84 and 86. The IP ports are for receipt of "industry pack" modules which are particular circuit modules designed to assist the processor 60 in accordance with the required application.

20   In the illustrated embodiment of the jackpot controller 32, an IP module 88 is coupled to the IP port 86. The IP module 88 is coupled to the network termination device 34 via the bus 33 for communication with the JCC 6. The processor 60 communicates with the JIBs 56 through the ethernet connector 78 which is connected to the venue jackpot LAN 30. The processor 60 also is coupled to a disk drive 90 via the connector 82. The operating system and
25 the operational software of the jackpot controller 32 are stored on the disk drive in UNIX file system format.

The IP module 88 can be implemented in a number of ways depending on the requirements for carrying out the jackpot system. In particular, the IP module can consist of
30 two physically separate boards with different functions that are covered below. Figure 6 is a more detailed block diagram of the IP module 88.

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The IP module 88 includes a connector 92 which is connected to the IP port 86 of the processor 60. The connector 92 is coupled to an IP module address bus 94, IP module data bus 96 and an IP module control bus 98. The buses 94, 96 and 98 are coupled to a DUART device 100 (e.g. AM85C30) which is arranged to control serial communications with the JCC

5   6. Serial communications can be made at an RS 232 connector 102 via a level converter 104. Alternatively, serial communications can be made through an RS 422 connector 106 via a level and protocol converter 108. The IP module 88 includes a memory 110 which is coupled to the buses 94, 96 and 98. Software and data is stored in the memory for enabling the jackpot controller to participate in multivenue jackpots as explained below. A memory supervisor

10 circuit 112 is coupled to the memory 110 to provide for battery backup should the power supply fail. The IP module 88 includes an electronically programable logic device (EPLD) 114 (e.g. EPM7064LC84) which provides various "glue logic" functions for the module 88. The EPLD 114 is coupled to a battery monitor circuit 116, an over temperature circuit 118 and an alarm circuit 120. The EPLD 114 is also coupled to an LED indicating device 122.

15 Control signals for controlling the LED are generated by the EPLD 114 from signals which could include MEMSEL and from the logic seal latch 139 and voltage comparators 147 and 148 (Figure 9).

The IP module 88 also includes logic seal detection circuitry 123 coupled to a logic

20 seal switch (not shown) via connector 124. The jackpot controller 32 is located within a secure housing which, when opened, changes the state of the logic seal switch coupled to the connector 124 and this will be sensed by the logic seal circuit 123 and this causes the jackpot controller to stop the jackpot game by sending appropriate messages to the participating EGMs. To restart the jackpots at the venue, a special command will be sent from the JCC 6

25 and received by the jackpot controller 32. The IP module 88 also includes an optional EPROM 125 (e.g. 27519) which can be used for further enhancements.

Figures 7, 8 and 9 show more details of the IP module 88. It will be seen that the logic bus 93 extends from the connector 92 to the DUART 100 and EPROM 125. The bus 93 is also

30 coupled to the EPLD 114 which, as mentioned above, is arranged to provide glue logic for the circuit components for the IP module 88. The EPLD 114 provides six main functional blocks:

acknowledge signal generation; I/O and memory read signal generation; interrupt acknowledge signal generation; I/O and memory write signal generation; memory decode, control signal generation; and status information storage. The acknowledge signal is generated from the trailing edges of the read and write signals. It is an open collector output. On reset the
5 acknowledge output is tri–stated. An intermediate read signal is generated when either IOSEL or MEMSEL is active and the R/W signal is in read state. The INTSEL signal is delayed before generating the read output; this is to allow the interrupt source to clear its interrupt output before reading the interrupt vector. The intermediate read signal is combined with the reset line to produce the I/O read signal. This is required because the serial communications
10 controller requires both its read and write lines to be held low to reset it. The I/O and memory write signals are generated when either a MEMSEL or IOSEL is active and the R/W line is in the write state. The I/O write line is combined with the reset line because the serial communications controller requires both its read and write lines to be held low during reset.

15   The DUART provides serial communications with JCC6. It is selected when an I/O read or write occurs or an interrupt acknowledge occurs, provided IOSEL is active.

    The memory 110 comprises first and second SRAMs 126 and 127 and is selected by the lines MEM0 and MEM1. MEM0 is generated from a combination of BS0, D13, D14 and
20 MEMSEL. MEM1 is generated in a similar manner except BS1 is used instead of BS0. The memories 126 and 127 can store data representing hard meter input signals from the various EGMs which are coupled to the jackpot controller 32. Normally the hard meter input to the credit played hard meter will be stored and this information is vital to correct playing of the jackpot and accordingly the memories are duplicates of one another so as to provide security
25 should one of them fail. Some gaming authorities require that certain information be maintained in two physical locations and three logical locations. The SRAMs 126 and 127 provide the physical locations. One of these SRAMs has two copies of the data, the other SRAM has a single copy of the data. Checksums are used to maintain the integrity of the data. If a single copy of the sensitive data becomes corrupted, then it is recovered by using one of
30 the other good copies. If for some reason there are three good copies, but they are different, a majority vote is used to decide which copy to replace. The memories 126 and 127 are

coupled to memory supervisor circuits 128 and 129 (e.g. DS1210) which operate with the associated backup to batteries to maintain high signal levels at the CE inputs of the memories should power fail so as to prevent data held in the memories being corrupted when power is disconnected. The DUART 100 is connected via the logic bus 93 to interface circuits 130 and

5   131 (e.g. SN75173) which convert RS 422 signals from the connector 106. The circuit also includes a converter 132 (e.g. SN75172) which converts TTL signals to RS 422 signals which are outputted to the connector 106. Inputs and outputs from the converters 130, 131 and 133 are coupled to the connector 106 via protection diodes 134, termination resistors 135 and current limiting resistors 136.

10

In some applications it may be appropriate to communicate with the JCC 6 at RS 232 levels and in this case, the IP module 88 includes a converter 137 (e.g. MAX211) which is arranged to convert signals from TTL to RS 232 and vice versa for coupling to the RS 232 output connector 102.

15

The logic seal circuit 123 is illustrated in more detail in Figure 9. The input connector 124 is connected to a logic seal switch (not shown) which is coupled via line 138 to an eight bit latch 139. The latch 139 is coupled to the logic bus 93 so that an eight bit number can be written into and read from the latch by the CPU 62 of the processor 60. If the logic seal switch

20   changes state, the latch 139 will be reset and this will be sensed by the CPU 62 thus indicating that the logic seal has been broken. This information will also be communicated to the JCC which will suspend participation of the EGMs in the jackpot game which are coupled to the jackpot controller having its logic seal switch open. The latch 139 is coupled to a memory supervisor chip 140 (e.g. DS1210) which operates to provide power to the latch 139 and also

25   to connect a battery backup thereto if the normal power supply is low. The circuit 140 also operates to prevent corruption to the number stored in the latch 139 if power fails. The CPU 62 can be arranged to write the eight bit number on lines d_0–d_7 once but preferably it is arranged to write different numbers periodically so as to provide for additional security.

30   Figure 9 also illustrates in more detail the over temperature circuit 118. It includes a connector 141 which is connected to a temperature sensing device (not shown) which is

located at a strategic location, say on a heat sink coupled to the CPU 64. The connector 141 is coupled to one input to a comparator 142 which has a reference level applied to its other input from a zener diode 143. The comparator 142 produces an output signal TEMPOV on line 144 when an over temperature is sensed. The comparator could be designed to trip at 5 65°C and reset at about 60°C, for example.

Figure 9 also illustrates the battery monitor circuit 116. It comprises first and second comparators 145 and 146 which are coupled to receive inputs on lines 147 and 148 from the backup batteries for the memories 126 and 127. Other inputs to the comparators 145 and 146 10 comprise a reference level derived from a zener diode 149. When the comparators 145 or 146 detect a low battery condition, a LOWBAT signal is produced on output line 150.

Figure 9 also illustrates the alarm circuit 120. The alarm circuit 120 has inputs 151 and 152 from the EPLD 114. The input 151 can be selected for muting an audible alarm produced 15 by alarm loudspeaker 153 whereas signals on the line 152 from the EPLD 114 can be used to change the frequency of the audible alarm in accordance with the type of alarm which is detected. The alarm circuit includes a timer 157 (such as an LM555) which is normally held in a reset state by a mute signal on input 151. When an over–temperature fault is detected or the logic area seal is broken, the alarm is set off. The alarm can only be reset under the 20 control of software. The two tone feature is implemented by switching in or out different value capacitors, into the timer circuit, by means of transistor 159.

Figures 10 to 18 diagrammatically illustrate some of the glue logic functions provided by the EPLD 114. It will be appreciated that these functions could be implemented by 25 providing discrete logic components in the circuitry but it is preferred that they be implemented in an electronically programmable device for simplicity and flexibility should the circuit parameters need to be modified.

The EPLD 114 is programmed so as to provide an address latch circuit 160 which 30 stores the address information from the multiplexer address/data lines. Figure 11 shows the memory latch 160 in greater detail. It will be seen that the memory latch 160 functionally

includes two eight bit latches 164 and 165.

The EPLD 114 includes status logic 167 (shown in greater detail in Figure 12) which has an input 168 for receipt of LAREA signals from the logic seal circuitry 123. The logic 167
5   includes an input 169 for receipt of TEMPOV signals from the circuit 118. The logic 167 includes an input 170 for receipt of LOWBAT signals from the battery monitor circuit 116. The logic 167 produces an LED signal output on line 171 for coupling to the status indicating LED 122. It has an output on line 172 for producing MUTE signals on line 151 for muting the alarm circuit 120. It also produces FREQSEL for selecting the tone produced by the
10 loudspeaker 153, as shown in Figures 9 and 12.

The EPLD 114 also includes a memory select logic 173 which has inputs on lines 174 from the CPU 62 via control bus 98. The input signals on lines 174 determine how data is stored in the memories 126 and 127. The memory logic circuitry 173 is shown in more detail
15 in Figure 13.

The EPLD 114 includes DUART selector logic 176 which enables the CPU 62 to address the DUART 100 whenever it writes to it or reads from it. The selector logic 176 is shown in more detail in Figure 14. Output on output line 176 has an 8530 output signal which
20 is coupled to the CE input of DUART 180 to enable the appropriate selection to be made, as seen in Figure 7.

The EPLD 114 includes write select circuitry 178 which has inputs from the logic bus
25 93 to produce outputs on lines 179 and 180 for enabling writing of data to the DUART 100 and memories 126 and 127 respectively. This circuit is shown in more detail in Figure 15.

The EPLD 114 includes acknowledge signal logic 181 which has inputs derived from the logic bus 93 and produces an input acknowledgment signal on output line 182 for
30 providing an acknowledgment signal for the DUART 100 for indicating to the CPU 62 that the current read or write function has been completed. The logic 181 is shown in more detail in

Figure 16.

The EPLD 114 includes read logic circuitry 183 which has inputs from the logic bus 93 and produces outputs on output lines 184 and 185 for enabling reading of signals from the

5   logic bus to the DUART 100 and for reading signals from the bus into the memories 126 and 127 respectively. The read logic 181 is shown in more detail in Figure 17.

The EPLD 114 includes acknowledge signal logic 186 which generates acknowledge signals ACK on its output line 187. The logic 186 has inputs derived from the logic bus 93

10   and its output line 187 is directly coupled to the connector 92 (pin 48) to provide acknowledgment signals to the CPU 62 to provide an indication that reading or writing sequences have been completed. The logic 186 is shown in more detail in Figure 18.

It will be appreciated by those skilled in the art that the various logical functions

15   carried out by the EPLD 114 can be implemented in a variety of ways.

The JIB software consists of three basic parts:
1.   The Boot Loader Program
2.   The Main Mode Program
20   3.   The Jackpot Interface Module (JIM)

The first two parts are executed physically by the microprocessor 16 from its software stored in memory 20 and reference is made to the aforementioned patent application. The JIM is an interface between the JIB and a Jackpot Application Program and is executed on the

25   jackpot controller 32 together with the Jackpot Application Program.

The Boot Loader Program operates to boot load the JIB 56. A flow chart of the program is shown in Figure 19. When the JIB starts up it operates as a cut down or simplified JIB. It does not support the full range of commands but instead the set of commands required

30   to perform software integrity (including signature) checks and software download. The boot program is always to be present in the memory 20 of the JIB; and for it to contain the ability

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to download new versions of the main code, which is the fully functional software, which is inputted thereto from time to time by the JCC 6.

The Boot Loader Program includes a loop which performs the following main
5 functions as diagrammatically shown in Figure 19:

1.   Sending an 'I am awake' message every 10 seconds;

2.   Continually checking for received ethernet packets;

3.   Checking that a packet has been received recently from the jackpot controller; and

10   4.   Patting a watchdog (The watchdog circuit reboots the processor should it hang. Also provided is a power failure detect. This enables important data to be stored in battery backed memory 20 before the power fails completely).

The JIB issues an 'I am awake' message regularly and, when the jackpot controller 32
15 receives these, it will send down series of initialisation messages and may also begin software download to its memory 20. If software download proceeds then this is fully processed within the boot code. Once the boot code receives the start command it immediately jumps to the main code, which has the responsibility of acknowledging the start command. The Boot Loader Program may also include provision of a procedure for initiating encryption of
20 communications between the JIB 56 and jackpot controller 32 in response to an "encrypt" message and encryption key from the jackpot controller 32.

The Main Mode Program includes code which supports all possible commands from the jackpot controller 32, including signature, display commands, event actions, state setting,
25 version, configuration and software download.

When a start command is issued to the JIB boot program by the jackpot controller 32, the main code of the JIB is executed and an acknowledge signal is sent back to the jackpot controller 32 acknowledging the start command. The Main Mode Program performs the
30 following functions:

1.   Receiving network packets and processing the commands appropriately;

2.   Checking if a packet has been received from the jackpot controller within the maximum communications idle time;

3.   Checking for any displays which have had expired duration;

4.   Checking for events which have occurred and subsequently performs the
5 configured actions for those events;

5.   Checking that the maximum communications idle time is not exceeded since the last time the JIB transmitted a network packet. The JIB will transmit a status message before the maximum communications idle time is exceeded;

6.   Operating the on board LED's; and

10   7.   Preventing the loops from proceeding if a power failure interrupt occurs.

Figure 3 diagrammatically illustrates major data flows within the JCC 6. In particular, the central computer 8 implements a jackpot application module 170, a network management module 172 and existing network games such as a KENO module 174. The central computer
15 8 also executes a LAN control module 176 which supervises and controls access to the LANs 10 and 19. The module 176 controls data flows to the front end processors 15 as shown. Figure 20 is a flow chart showing major software steps performed by the JCC 6.

Preferably the jackpot controller 32 will have the option to accept its application
20 software downloaded from JCC 6 for carrying out a jackpot game at the venue. The following security measures can be implemented for the download: secure encrypted links through the WAN 4; the signature of the software is verified by central computer 8 before allowing normal operational mode of the jackpot controller 32; and the jackpot controller keeps a history log of every download.
25

The downloading can be used for retrofitting the jackpot controller software when it is required to update the software. The jackpot controller controls the slip printer 50 and bar code reader 52 through the interface 54. The slip printer 50 is used to produce the jackpot win tickets. The bar code reader 52 is used to validate the jackpot tickets.
30

Normally, the parameters of the jackpot are established in the jackpot data base

maintained in the MIS computer 23 and then transmitted to the various venues by JCC 6 where they are initially processed by the jackpot controllers 32. These inputs can be made through by a JDB terminal (not shown) by an authorised officer. The jackpot parameters may include the period for the random time generation, the upper limit of the jackpot, lower limit of the

5 jackpot, percentage contribution from each EGM, restart values etc. After checking and verification, the parameters can be frozen by a special command issued from the JDB terminal. The locked configuration is then transferred to the jackpot application software module 170 of the central computer 8. The transfer is initiated by a command issued from the command PC 14.

10

The jackpot configuration is then transmitted to the jackpot controllers 32 of the various venues 26. The jackpot controllers receive the jackpot configuration, perform dependency checks and store it in a battery backed RAM 110. The jackpot controller 32 acknowledges the reception of the configuration to the JCC 6 which acknowledges it to the

15 management information system 21, which includes the JDB. From this moment the entered configuration becomes "active". Any further changes of the parameters on the JDB will be stored in the "pending" state and need to be activated using the process described above.

When the jackpot controller 32 receives the jackpot configuration it converts it to the

20 form that is acceptable by the JIBs 56 of the participating EGMs. When a JIB 56 is coming on-line, the jackpot controller 32 transmits the jackpot configuration thereto via its ethernet connector 78 and venue jackpot LAN 30. Each JIB 56 receives the configuration, stores it in its RAM 20 and sends an acknowledgment to the jackpot controller 32 via the venue jackpot LAN 30. If a JIB 56 is already on-line, a new jackpot configuration can be transmitted to it

25 by the jackpot controller. Once a JIB 56 receives its jackpot configuration, its microprocessor 16 causes the video mixing device 42 to overlay the unique number of the EGM on the screen of the EGM.

Once the configuration of a jackpot is successfully set up in participating jackpot

30 controllers and EGMs, a start command message can be issued from the command PC 14 at the JCC 6. Once the jackpot controller 32 receives the start command from the JCC 6, it

activates the JIBs 56 of participating EGMs and if attached, the interfaces 48 and 54 for jackpot displays 38 and 40. After all the jackpot controllers 32 have acknowledged the reception of the hidden prize value, the JCC 6 will cause the jackpot controllers 32 to activate the JIBs 56 of participating EGMs and the interfaces 48 and 54 for jackpot displays 38 and 40

5 at the various venues. At each venue, the jackpot controller 32 broadcasts a jackpot open command together with a corresponding message to be displayed. All the messages for the JIBs 56 and interfaces 46 and 48 are identified by message identification signals (message IDs) during the configuration stage. The jackpot controller 32 therefore need only broadcast the message ID to cause the display of the appropriate message. The JIBs 56 will overlay the

10 messages on the EGM's screen and messages will be displayed on the monitors 40 and LED displays 38.

For every $1 played on an EGM, a hard meter input pulse is generated by the EGM logic to increment its amount played hard meter. The JIB 56 receives this input pulse via

15 connector 120 and increments the software counter that contains the accumulated number of pulses (absolute value). The jackpot software executed by the microprocessor 16 converts the counter value into cents by adding 100 for every one detected pulse. The JCC 6 configures the minimum number of contributions before the JIB 56 will report to the jackpot controller 32. This is also controlled by a timeout period. For example, if the JIB 56 is configured to

20 report a minimum contribution of, say, $3 with a time out of 5 seconds, once more than $3 has been incremented (i.e. 3 pulses to the hard meters) the JIB 56 sends a communication packet to the jackpot controller 32 which contains the current time stamp and the software counter value. If the venue jackpot LAN 30, is busy, the JIB 56 will retry next time. This means that the software counter can be incremented more than once between each transmission.

25

If a contribution of less than the configured minimum limit (e.g. $3) has been received by the JIB 56 but the time since the first of the unreported contributions was received is greater than the timeout period (e.g. 5 seconds) then the unsent contributions are forwarded to the jackpot controller 32 in any event.

30

Every defined period of time the jackpot controller 32 also sends all individual EGM

contributions to the JCC 6 for financial reconciliation purposes. At the JCC 6 all the received contributions are stored in a transaction file 109.

The jackpot controller 32 must continue to communicate with the JCC 6 to continue 5 participation in the jackpot. If the jackpot controller 32 loses the communications with the JCC 6, the jackpot will be suspended and appropriate message will be displayed by all JIBs 56 and optional displays 38 and 40. Likewise, the JIBs must continue to communicate with the jackpot controller 32. If a JIB loses communication with the jackpot controller 32, the JIB stops accepting contributions from the EGM and can, for example, display a message to 10 inform the player that their EGM is no longer in the jackpot.

In the case of a jackpot win, the jackpot controller 32 performs the following actions:
display jackpot win message on a monitor of the jackpot controller for the venue attendant;
15 commands the interfaces 46 and 48 to display jackpot win messages on the venue displays, the win message including EGM identification number as is displayed by the JIB;
command the JIBs of all non-winning EGMs to display to the players that the jackpot was won by another EGM, this being carried out by broadcasting a particular message ID to the JIBs; and
20 request the JCC 6 to generate a special jackpot win ticket which is printed on the slip printer 50, the ticket being delivered by the venue attendant to the player of the winning EGM.

There are two possible ways to clear the jackpot win condition on an EGM: (1) the venue attendant will clear the error condition that disabled the EGM; or (2) the EGM will 25 remain disabled until a special clear command has been received from the jackpot controller 32 and originating in the JCC 6.

Information relating to the jackpot win ticket will be stored on the JCC 6 so that the player can redeem the ticket any time after the win. An authentication number on the ticket 30 can be presented in two formats – a number and a bar code. The bar code reader 52 enables easy ticket validation.

Figure 22 is a flow chart which diagrammatically sets out the major functional steps of the software carried out in the jackpot controller 22 to give effect to the steps described above.

5   The Jackpot Interface Module (JIM) executed in jackpot controller 32 provides a connecting interface between the Jackpot Application Program executed at the JCC 6 and the JIBs 56. Briefly, the JIB software and the jackpot controller software can be viewed as consisting of the following functional blocks:

    1.   interface functions used by the customer application, this is the set of functions
10 used by the Jackpot Application to communicate with the JIB network;

    2.   within the JIM, a set of functions used to process most of the interface functions;

    3.   a process which receives network packets on bus 33 and processes them;

    4.   a process which periodically checks to see if messages need to be retransmitted
15 and also checks timing of broadcast by the jackpot controller 32 of 'I am alive' messages; and

    5.   a set of support modules which provide database, ethernet, queue interface functions.

An alternative jackpot scheme is a mystery jackpot value and in this arrangement the
20 mystery jackpot value is generated and maintained by the JCC 6.

Data representing contributions towards that jackpot are transmitted to the JCC 6 via the jackpot controllers 32 at the various venues 26. The JCC 6 operates a software counter to effectively sum data signals representing EGM contributions. When the JCC 6 determines
25 that the jackpot total is reached, it identifies the site where the contribution which lead to reaching the jackpot value. The JCC 6 then transmits a signal to the jackpot controller 32 at the site. The jackpot 32 at that site then declares that the next EGM at that venue to make a contribution is the winner of the jackpot.

30   Figure 21 illustrates a preferred system of the invention which includes display of a Provisional Win message at the venue whilst various checks are carried out. In this system

when a random time occurs, the JCC 6 randomly selects a venue (using venue weighting list) and sends a Select EGM message to the jackpot controller 32 at the selected venue. The jackpot controller then waits for the next hard meter input signals from any EGM connected thereto (and participating in the jackpot) and checks if the corresponding JIB software passes

5 software integrity tests. If yes, a Provisional Win message is displayed at the venue and details of the identity of the EGM are sent to the JCC 6. The provisional winning EGM details are sent to the JCC 6 by the jackpot controller 32 and the JCC 6 dispatches a Win Ticket message to all of the jackpot controllers. The jackpot controller receives the Win Ticket message and causes an appropriate message to be displayed on the winning EGM screen.

10 Also a message such as Jackpot Won is displayed on all other EGM screens at the venue. The jackpot controller also sends an acknowledge (ACK) message to the JCC 6. The jackpot controller causes the winning ticket to be printed and displayed on a screen coupled to a venue PC (if provided). The jackpot controller then causes the winning EGM to be disabled so that it cannot proceed with normal play. After the jackpot is won, the JCC is automatically

15 restarted by a start command. The winning EGM will be cleared by a command which originates in the JCC 6.

Many modifications will be apparent to those skilled in the art without departing from the spirit and scope of the invention as defined in the claims appended hereto.

CLAIMS:

1.   A multivenue jackpot system comprising a central control system and a plurality of gaming venues, each gaming venue including:

5   a jackpot controller coupled for communication with said central control system by way of a communications network;

       a plurality of electronic gaming machines (EGMs) each including hard meters and EGM logic for generating input signals for the hard meters; and

       a venue network coupled to said jackpot controller;

10   wherein each electronic gaming machine includes a jackpot interface coupled to the electronic gaming machine and the venue network, each said jackpot interface being coupled to monitor said hard meter input signals, and said central control system including a jackpot sum which is incremented and/or awarded to a selected electronic gaming machine in accordance with said input signals.

15

2.   A multivenue jackpot system as claimed in claim 1, wherein each said jackpot interface comprises a circuit board adapted to be coupled to an otherwise standard electronic gaming machine.

20 3.   A multivenue jackpot system as claimed in claim 1, wherein each said jackpot interface is responsive to the hard meter input signals of the respective EGM to communicate corresponding first data messages to the respective jackpot controller.

4.   A multivenue jackpot system as claimed in claim 3, wherein said first data messages 25 are sent from a said jackpot interface when a selected amount of money has been played on the corresponding EGM during a preceding selected time period.

5.   A multivenue jackpot system as claimed in claim 3, wherein each said jackpot controller communicates second data messages to said central control system by way of said 30 communications network, the second data messages being sent from each jackpot controller every predetermined period of time, wherein said second data messages contain information

of the hard meter input signals of the EGMs coupled to the corresponding said jackpot
controller.

6.   A multivenue jackpot system as claimed in claim 5, wherein said jackpot sum is
5 incremented in response to said second data messages.

7.   A multivenue jackpot system as claimed in claim 5, wherein said jackpot sum is
awarded in response to a said second data message.

10 8.   A multivenue jackpot system as claimed in claim 5, wherein said second data messages
include information identifying the EGMs corresponding to the hard meter input signals.

9.   A multivenue jackpot system as claimed in claim 6, wherein said jackpot sum is
awarded in response to a said second data message.
15

10.   A multivenue jackpot system as claimed in claim 9, wherein said second data messages
include information identifying the EGMs corresponding to the hard meter input signals.

11.   A multivenue jackpot system as claimed in claim 10, wherein said jackpot sum is
20 incremented by said central control system on the basis of the information of the hard meter
input signals corresponding to individual said EGMs, and wherein said jackpot sum is awarded
to a particular said EGM for which the hard meter input signals cause said jackpot sum to
reach a predetermined jackpot total.

25 12.   A multivenue jackpot system as claimed in claim 7, wherein said central control
system communicates a third data message to said jackpot controllers indicating the award of
said jackpot sum and identifying a particular EGM to which the jackpot sum is awarded.

13.   A multivenue jackpot system as claimed in claim 12, wherein the jackpot controller
30 to which said particular EGM is coupled includes means for indicating the award of the
jackpot sum to the particular EGM.

- 23 -

14.   A multivenue jackpot system as claimed in claim 13, wherein each said jackpot controller includes a ticket issuing device for issuing a ticket indicative of a said jackpot award.

5 15.   A multivenue jackpot system comprising:

a central control system;

communications interface for coupling the central control system to a communications network;

a plurality of gaming venues;

10   each gaming venue including a jackpot controller coupled for communication with said central control system by way of the communications network, a plurality of electronic gaming machines (EGM) each including hard meters and EGM logic for generating input signals for the hard meters, and a venue network and wherein each electronic gaming machine includes a jackpot interface for coupling the electronic gaming machine to the venue network and 15 wherein the jackpot interface is coupled to monitor said hard meter input signals and wherein the central control system establishes a jackpot which is based upon the occurrence of a random event, and upon occurrence of the random event the central control system selects a winning venue and wherein the jackpot controller at the winning venue is arranged to select a winning EGM by reference to hard meter input signals derived from the EGM logic.

20

16.   A multivenue jackpot system as claimed in claim 15, wherein said random event comprises the passing of a randomly selected time.

17.   A multivenue jackpot system as claimed in claim 15, wherein each said jackpot 25 interface comprises a circuit board adapted to be coupled to an otherwise standard electronic gaming machine.

18.   A multivenue jackpot system as claimed in claim 15, wherein each said jackpot interface is responsive to the hard meter input signals of the respective EGM to communicate 30 corresponding first data messages to the respective jackpot controller.

19.   A multivenue jackpot system as claimed in claim 18, wherein said first data messages are sent from a said jackpot interface when a selected amount of money has been played on the corresponding EGM during a preceding selected time period.

5 20.   A multivenue jackpot system as claimed in claim 18, wherein each said jackpot controller communicates second data messages to said central control system by way of said communications network, the second data messages being sent from each jackpot controller every predetermined period of time, wherein said second data messages contain information of the hard meter input signals of the EGMs coupled to the corresponding said jackpot 10 controller.

21.   A multivenue jackpot system as claimed in claim 20, wherein said second data messages include information identifying the EGMs corresponding to the hard meter input signals.

15

22.   A multivenue jackpot system according to claim 18, wherein said random event comprises the triggering of a mystery jackpot value, in response to receipt of a said second data message, and wherein said central control system communicates a third data message to the jackpot controller from which the second data message which triggered the mystery 20 jackpot value was received.

23.   A multivenue jackpot system as claimed in claim 22, wherein the jackpot controller which triggered the mystery jackpot value is responsive to receipt of said third data message to select a winning EGM coupled thereto for award of the jackpot on the basis of said first data 25 messages received from the plurality of EGMs coupled thereto.

30

FIG 1

VENUE CONFIGURATION

FIG 2

COMMAND PC 14

USER REQUESTS   JACKPOT PROGRESS ALARMS

RTU 8

JACKPOT APPLICATION 170

NETMAN 172

KENO APPLICATION 174

JACKPOT MESSAGES   FEP CONTROL JACKPOT MESSAGES   KENO MESSAGES

176 LAN CONTROL

JACKPOT MESSAGES   FEP CONTROL   KENO MESSAGES

FRONT END PROCESSOR   15

POLLS MESSAGES   RESPONSES

WIDE AREA NETWORK   4
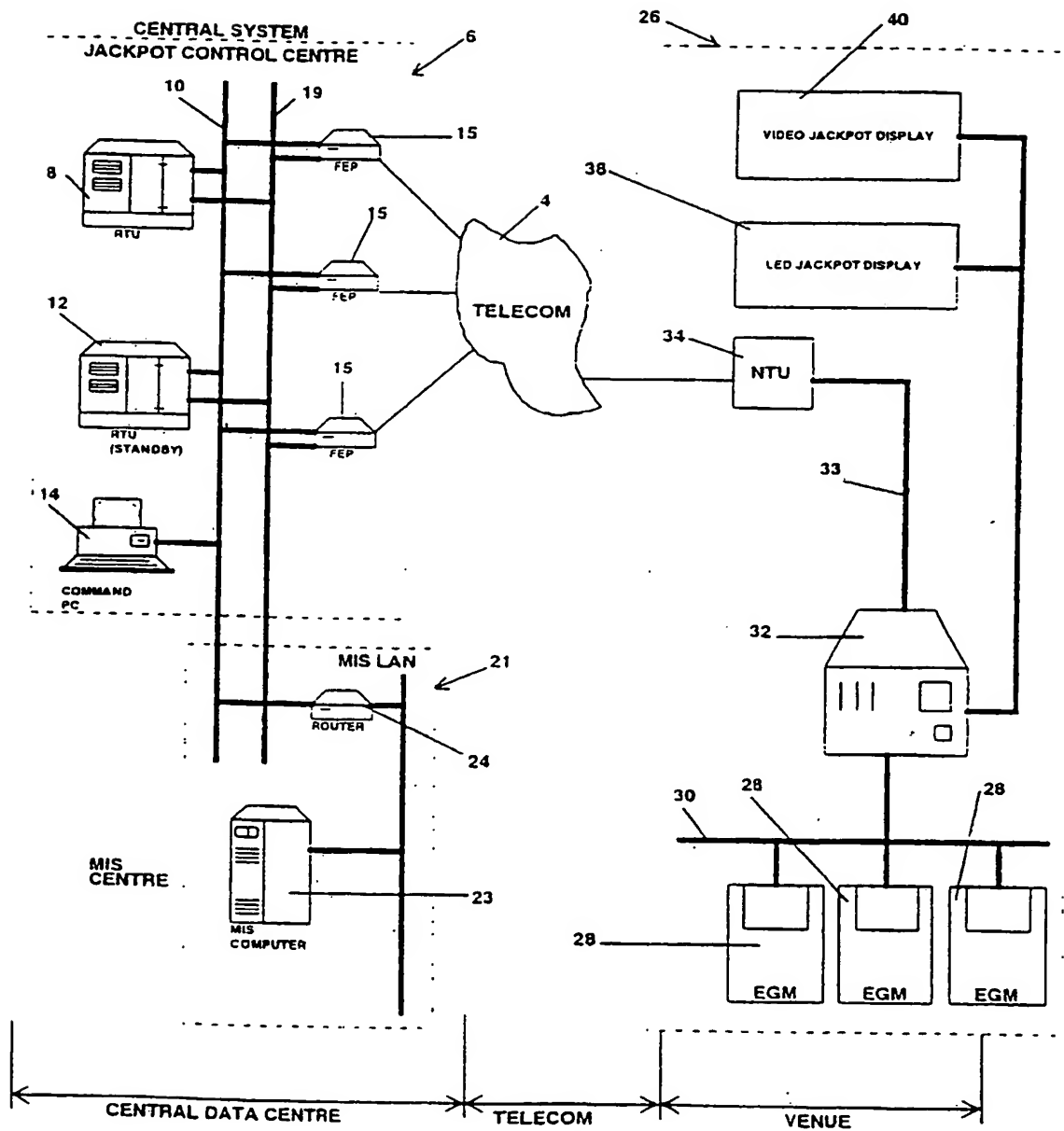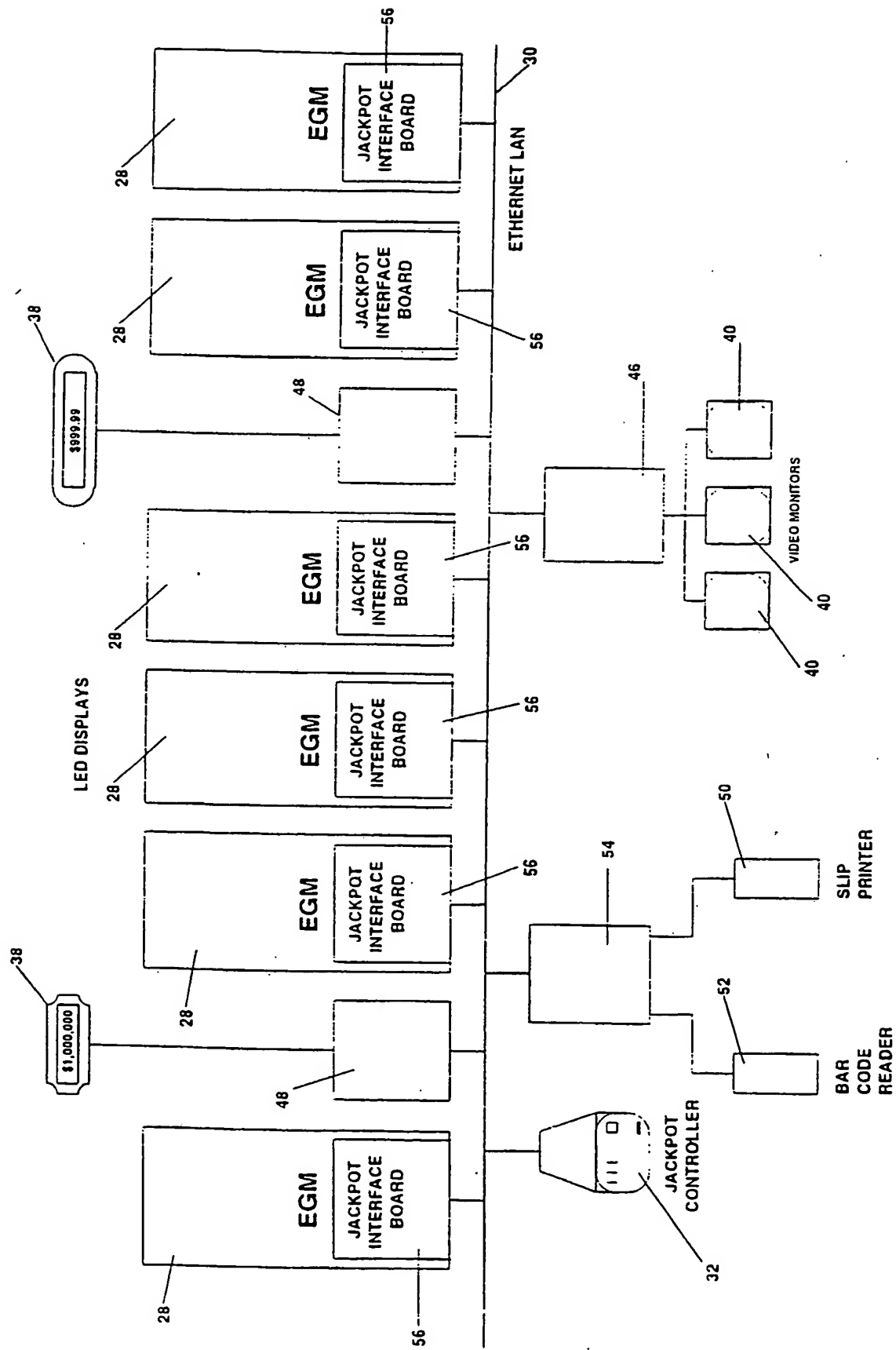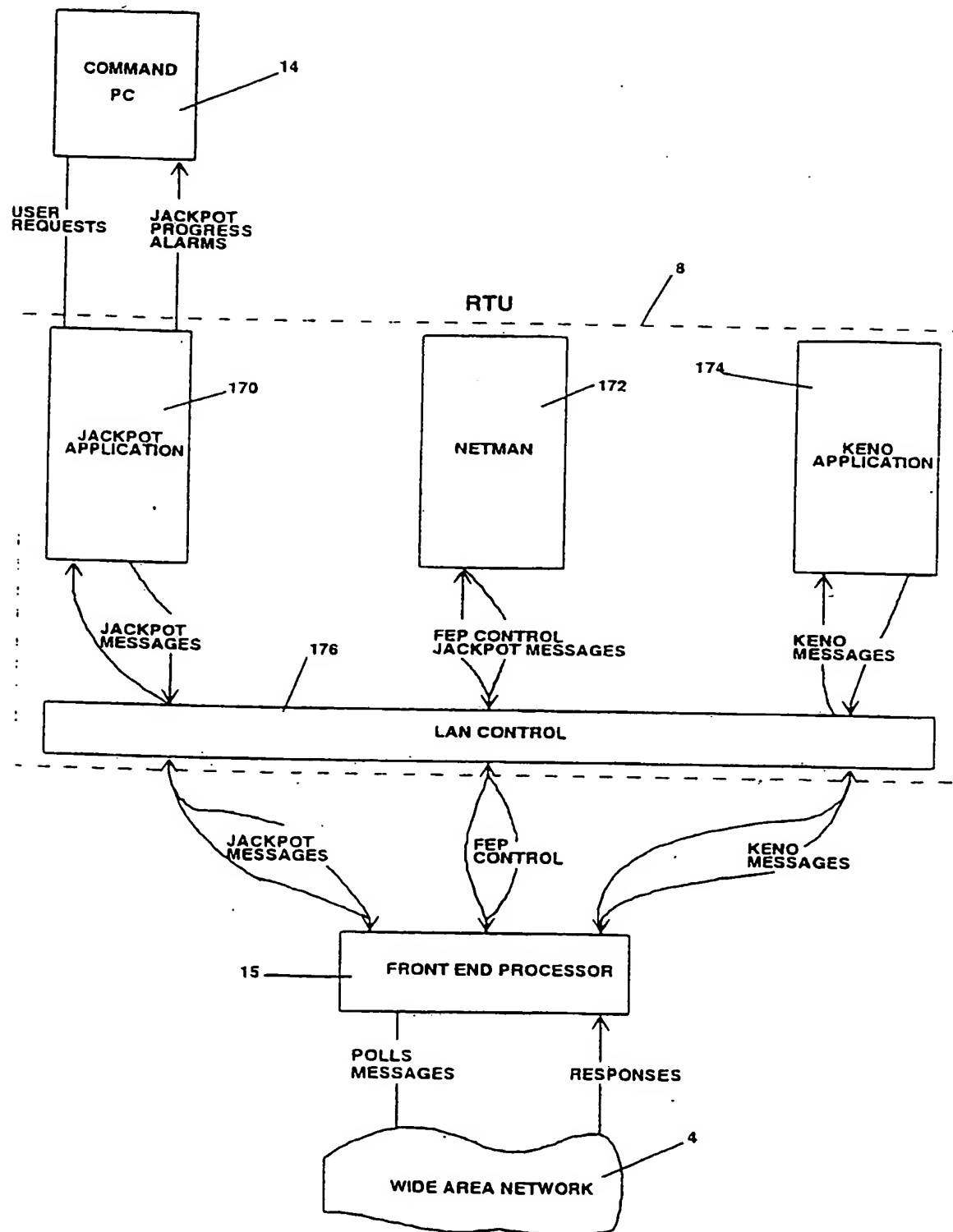
JACKPOT CONTROL CENTRE

FIG 3

SUBSTITUTE SHEET (RULE 26)
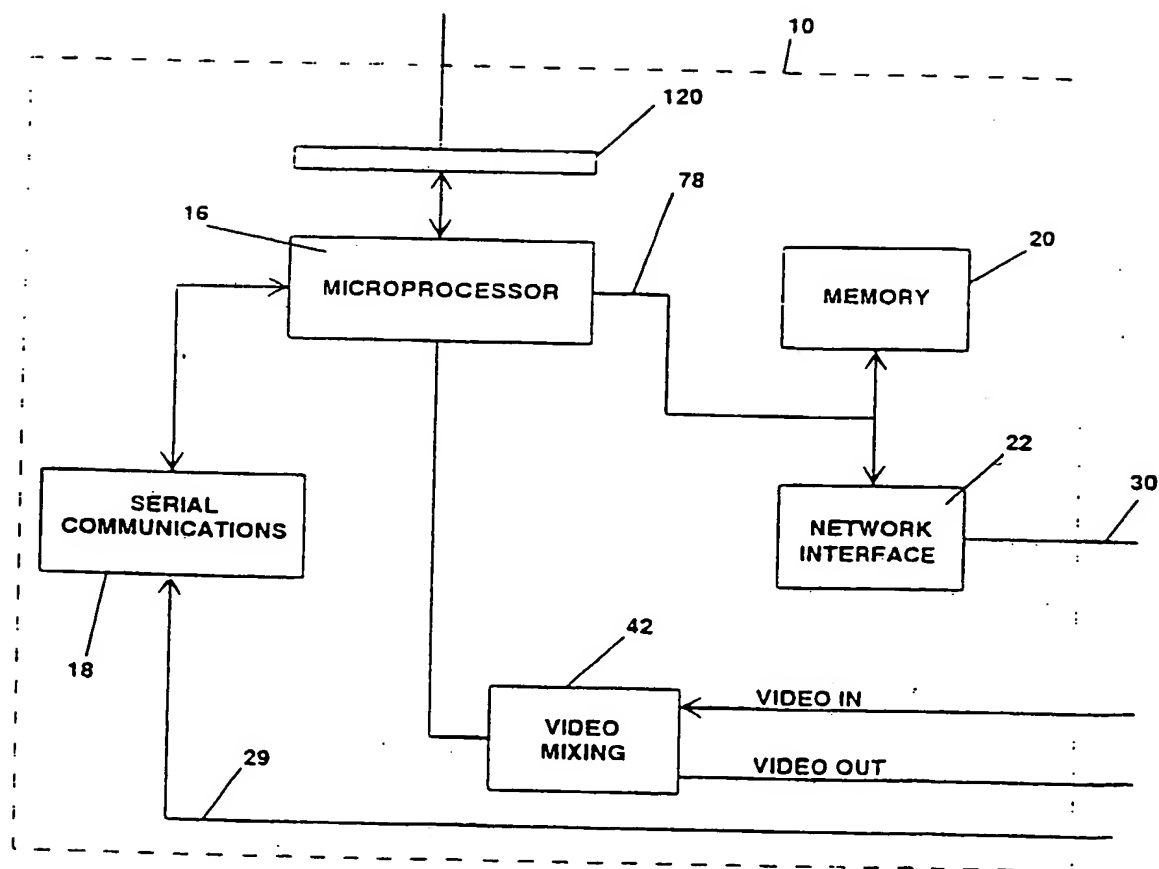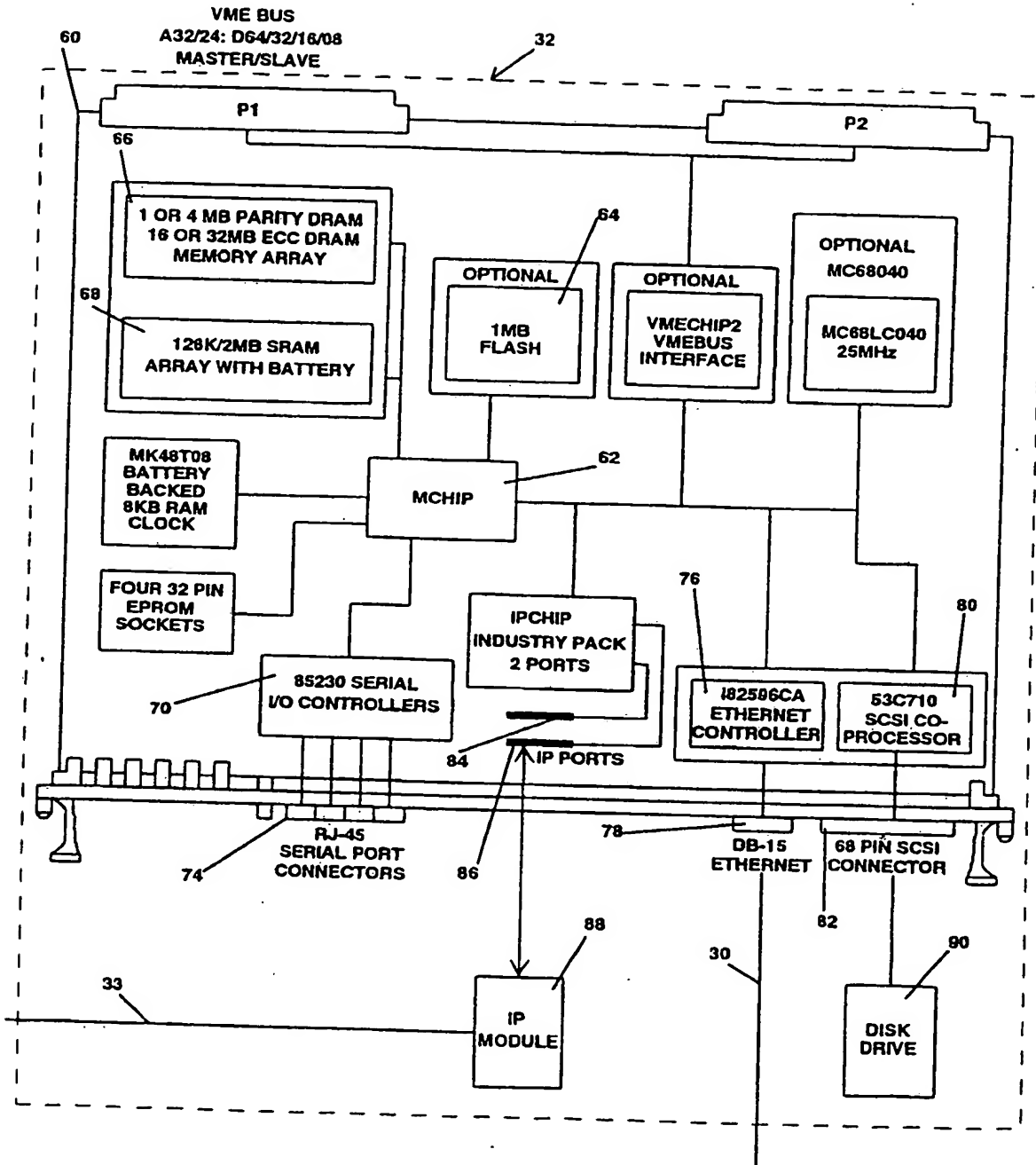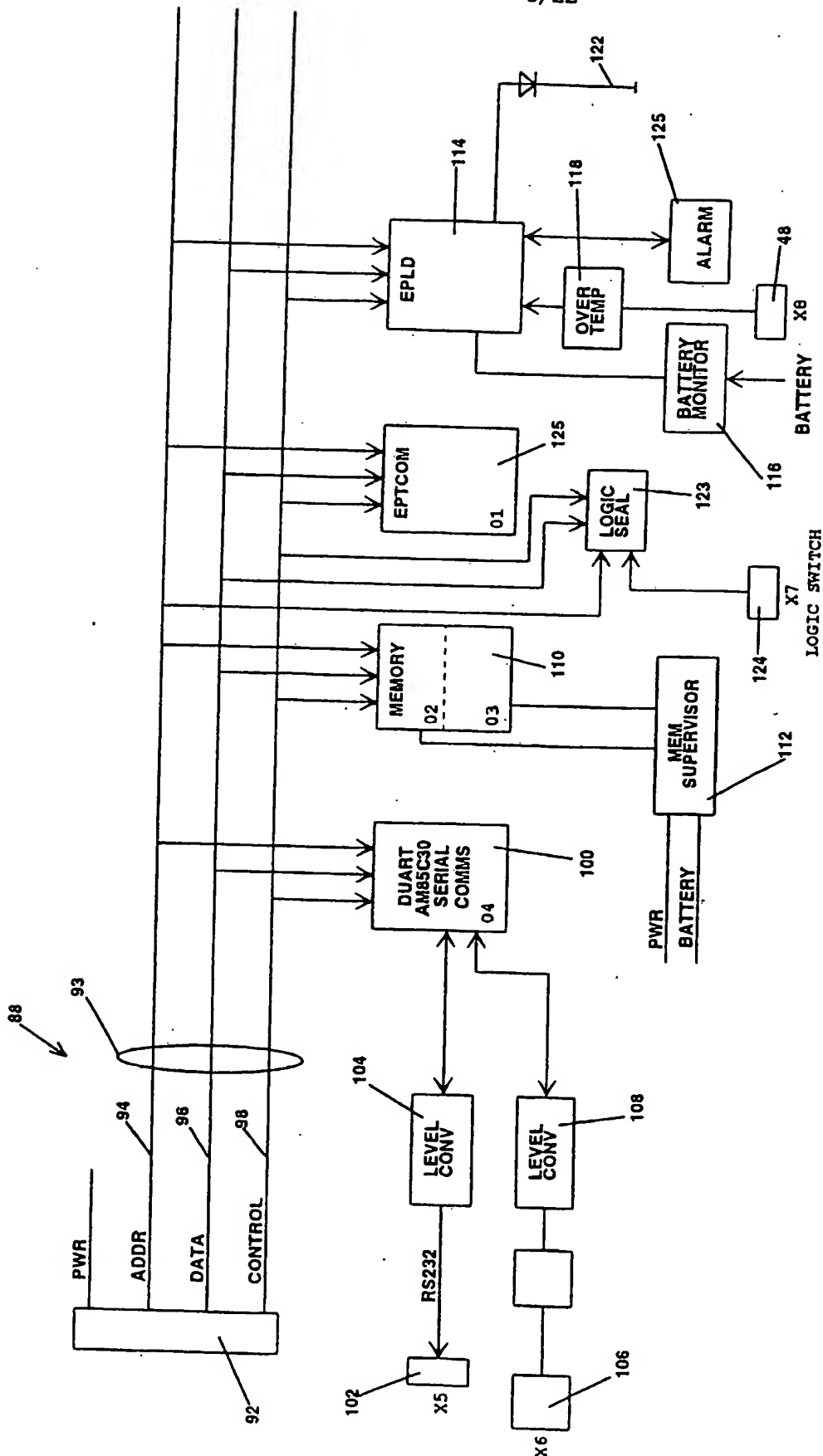
FIG 4

VME BUS
A32/24: D64/32/16/08
MASTER/SLAVE

60

32

P1

P2

66

| 1 OR 4 MB PARITY DRAM |
| 16 OR 32MB ECC DRAM |
| MEMORY ARRAY |

68

64

OPTIONAL

1MB FLASH

OPTIONAL

VMECHIP2 VMEBUS INTERFACE

OPTIONAL MC68040

MC68LC040 25MHz

128K/2MB SRAM ARRAY WITH BATTERY

MK48T08 BATTERY BACKED 8KB RAM CLOCK

62

MCHIP

FOUR 32 PIN EPROM SOCKETS

76

80

70

85230 SERIAL I/O CONTROLLERS

IPCHIP INDUSTRY PACK 2 PORTS

I82596CA ETHERNET CONTROLLER

53C710 SCSI CO-PROCESSOR

84

IP PORTS

74

RJ-45 SERIAL PORT CONNECTORS

86

78

DB-15 ETHERNET

68 PIN SCSI CONNECTOR

82

88

33

30

90

IP MODULE

DISK DRIVE

FIG 5

FIG 6

FIG 7

FIG 8

FIG 9

LOGIC SEAL

ALARM

TEMPERATURE SENSOR

FIG 10
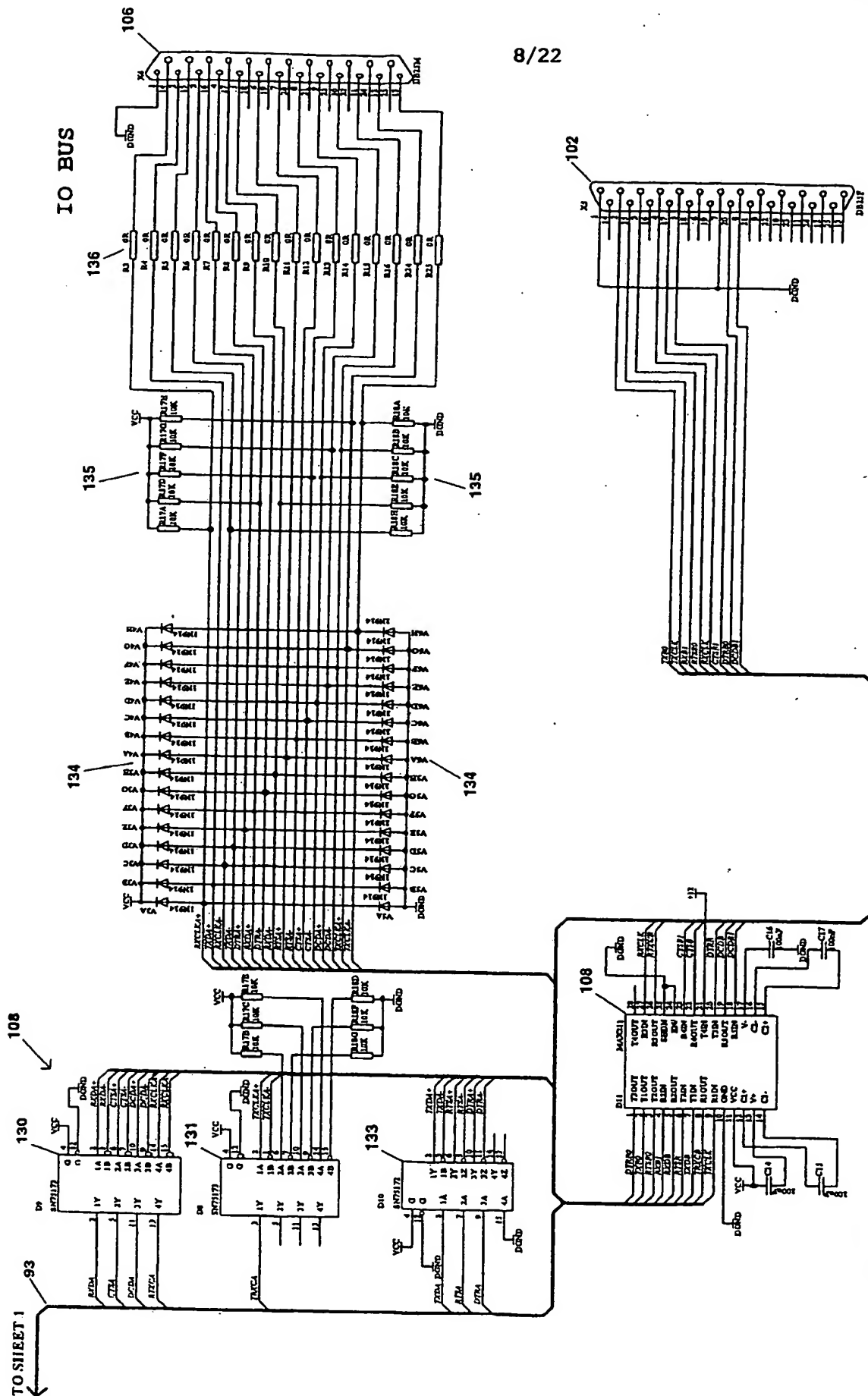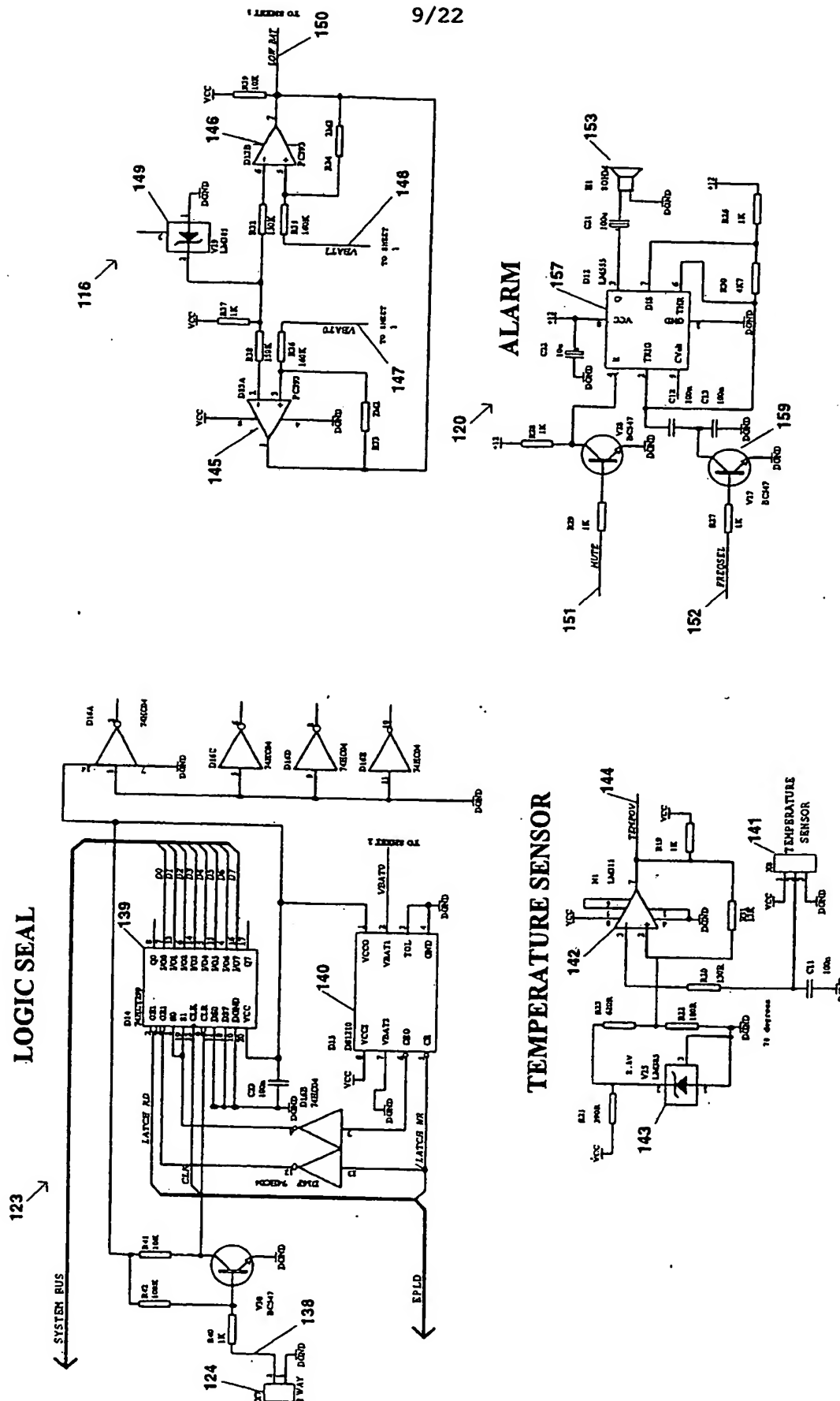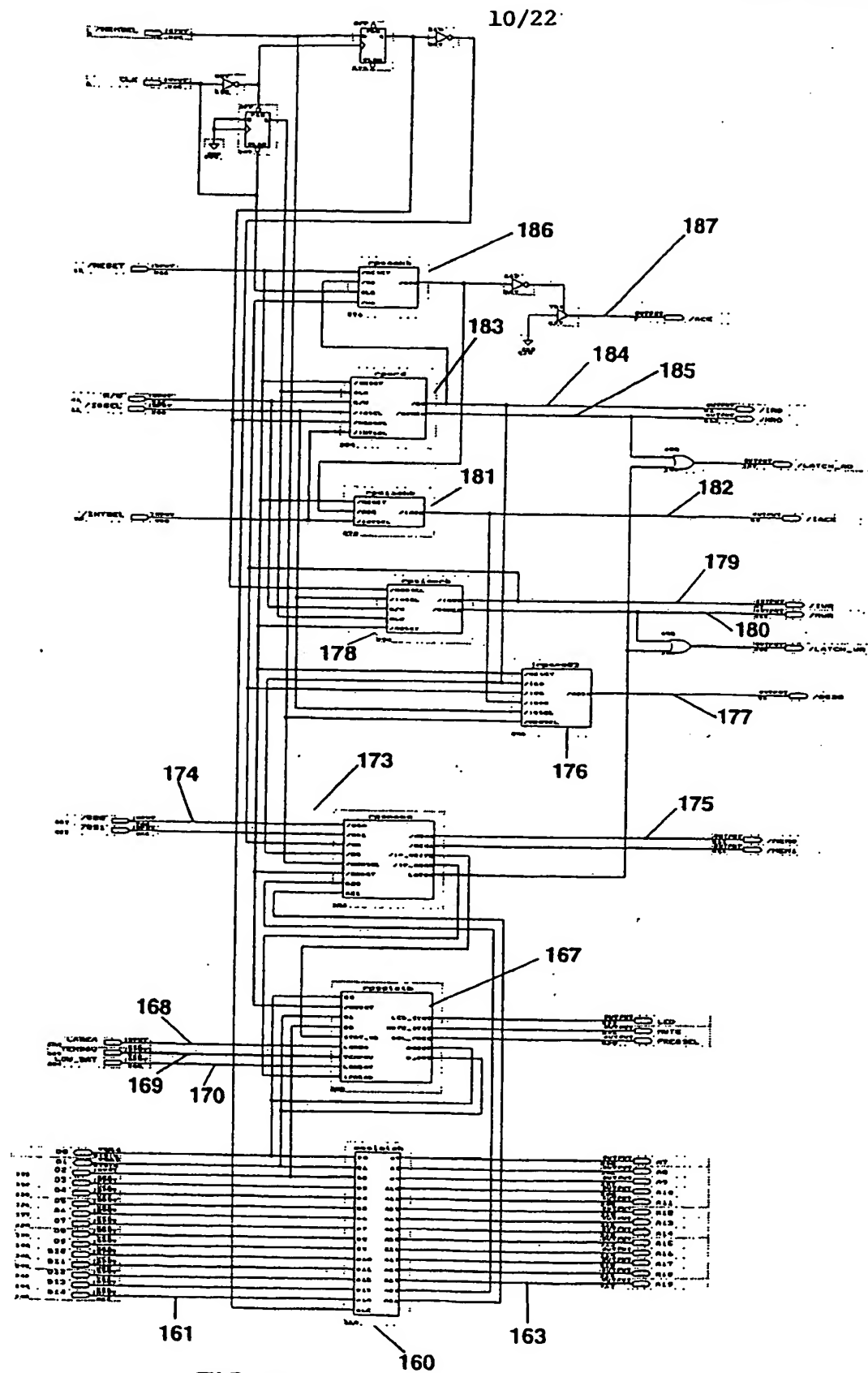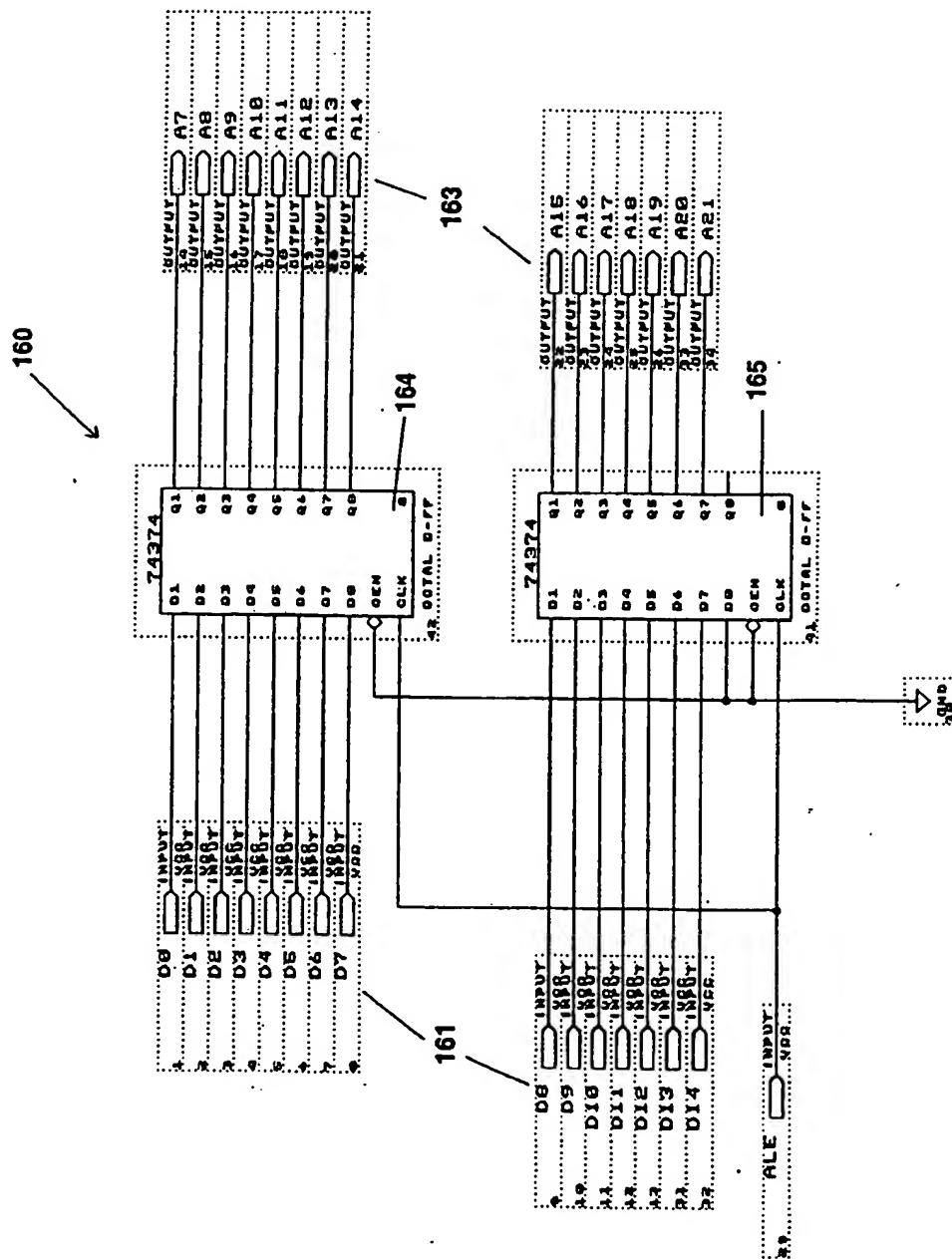
FIG 11
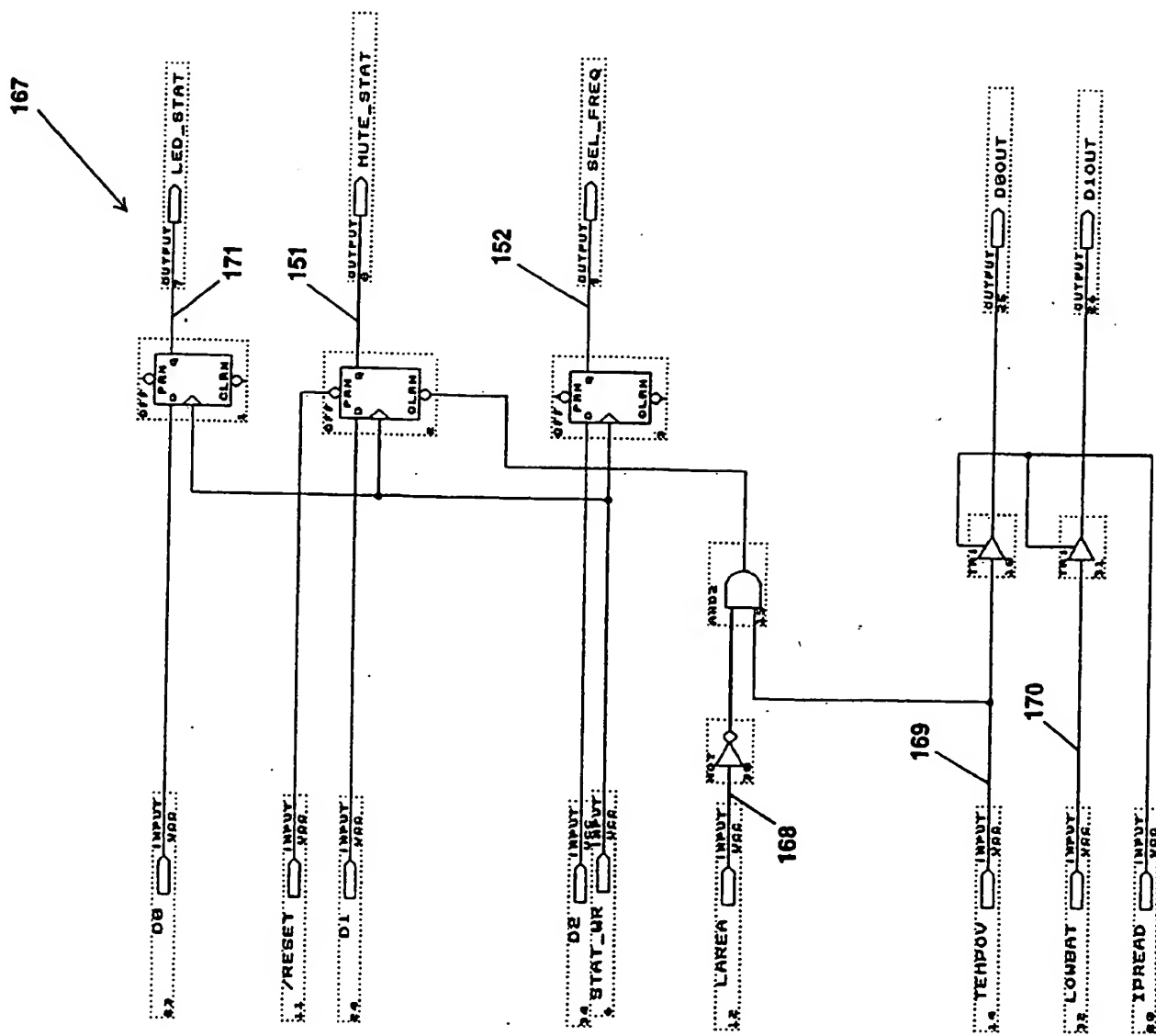
FIG 12
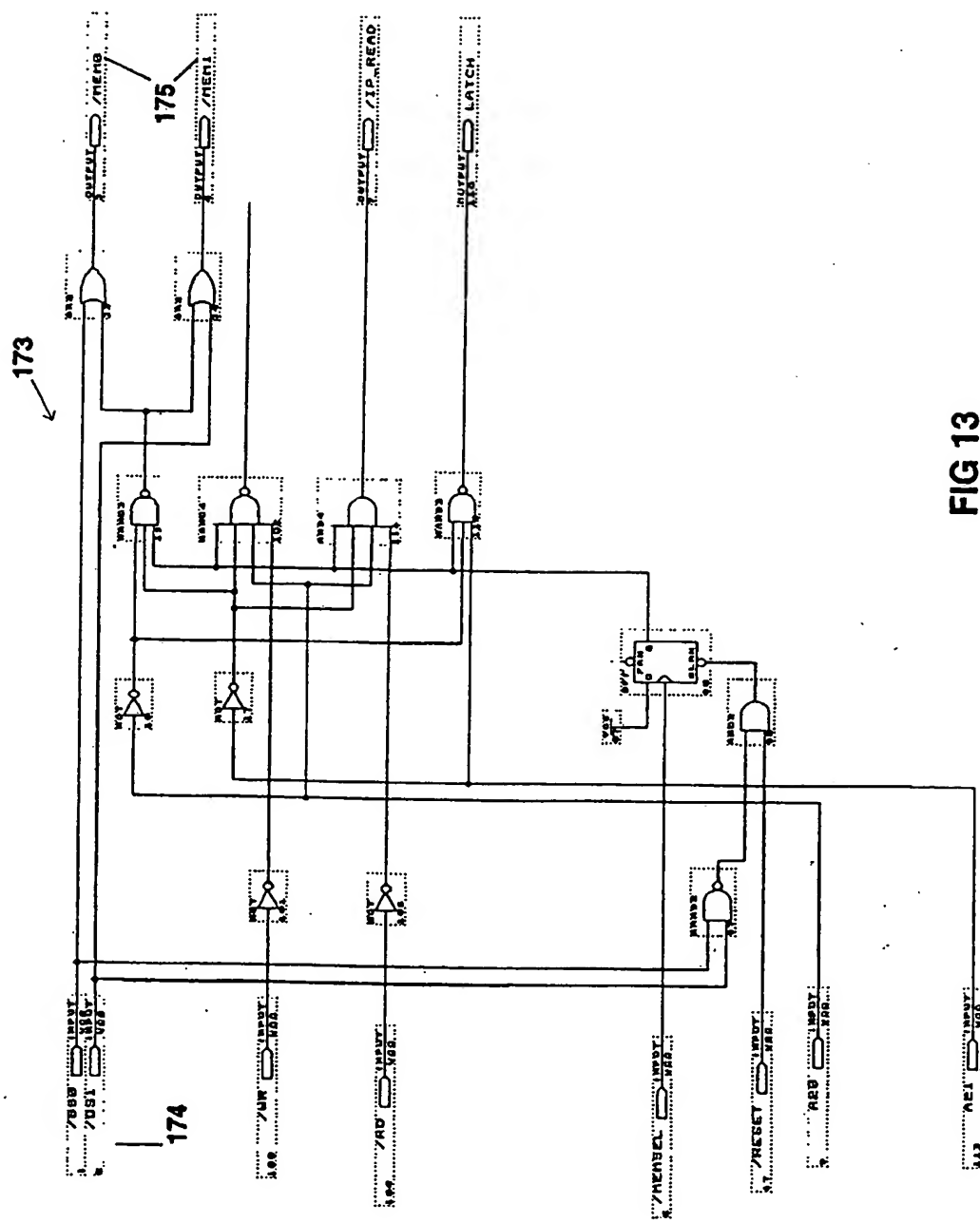
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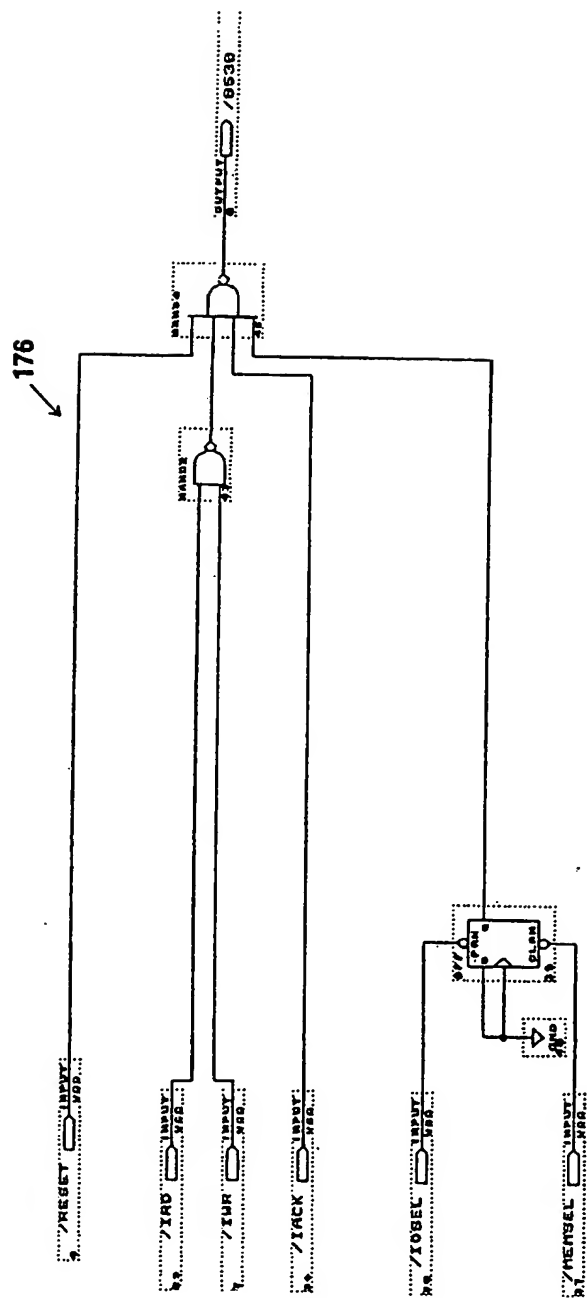
FIG 14
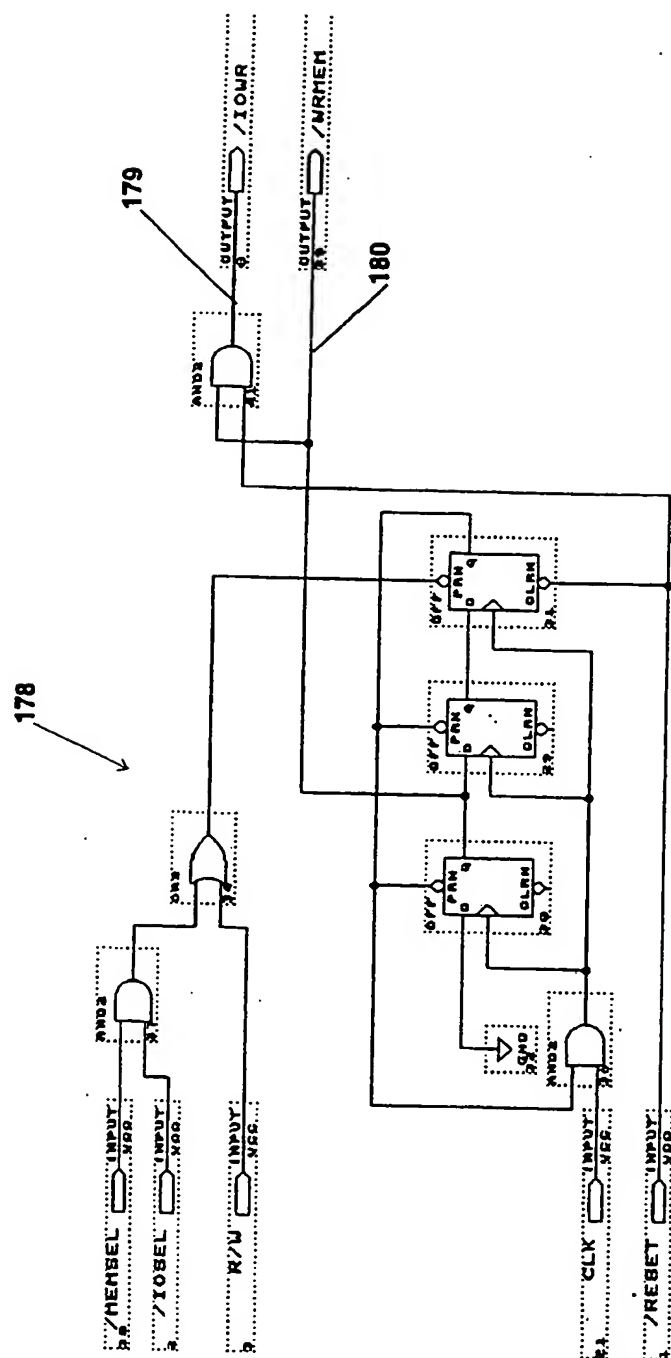
FIG 15
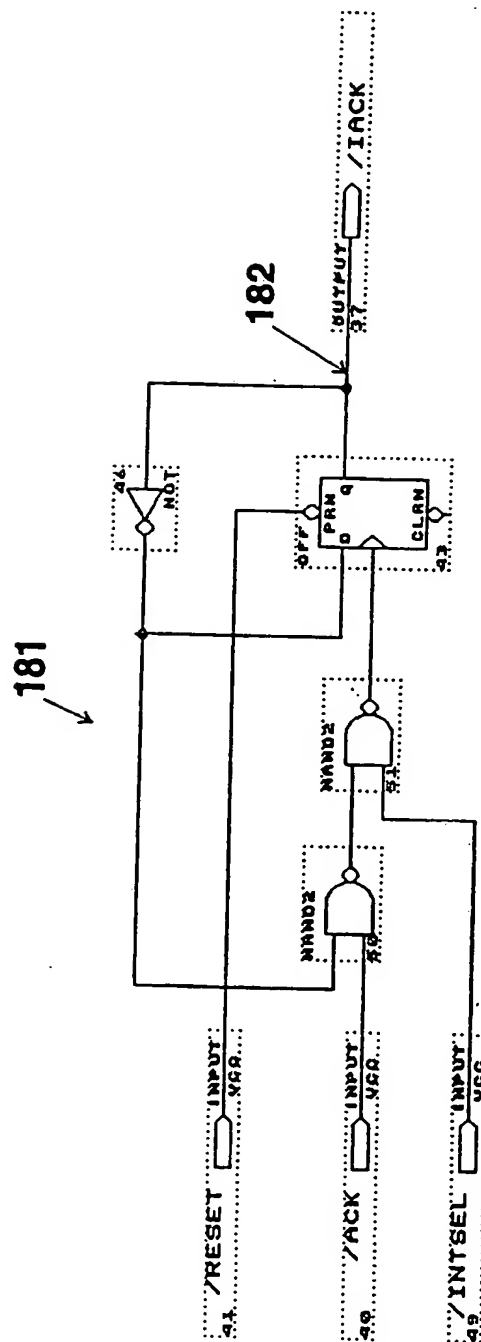
FIG 16
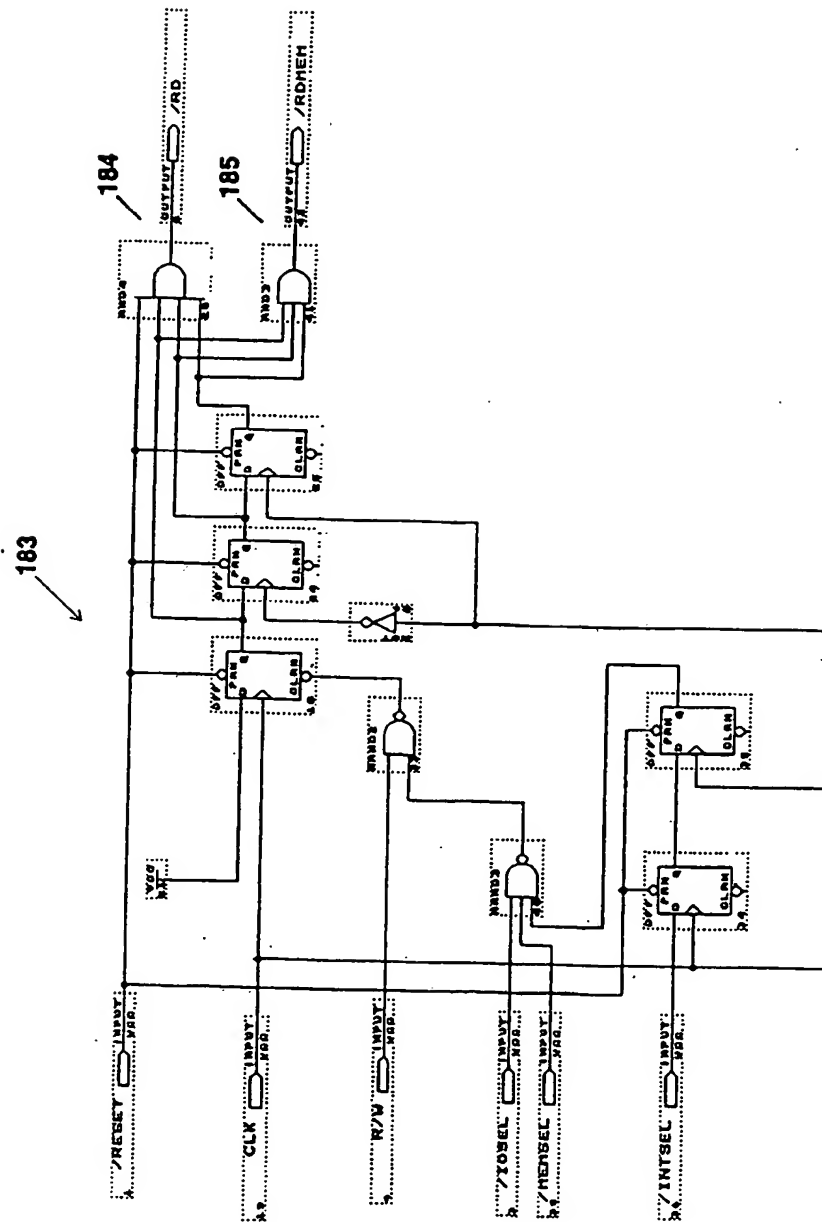
FIG 17
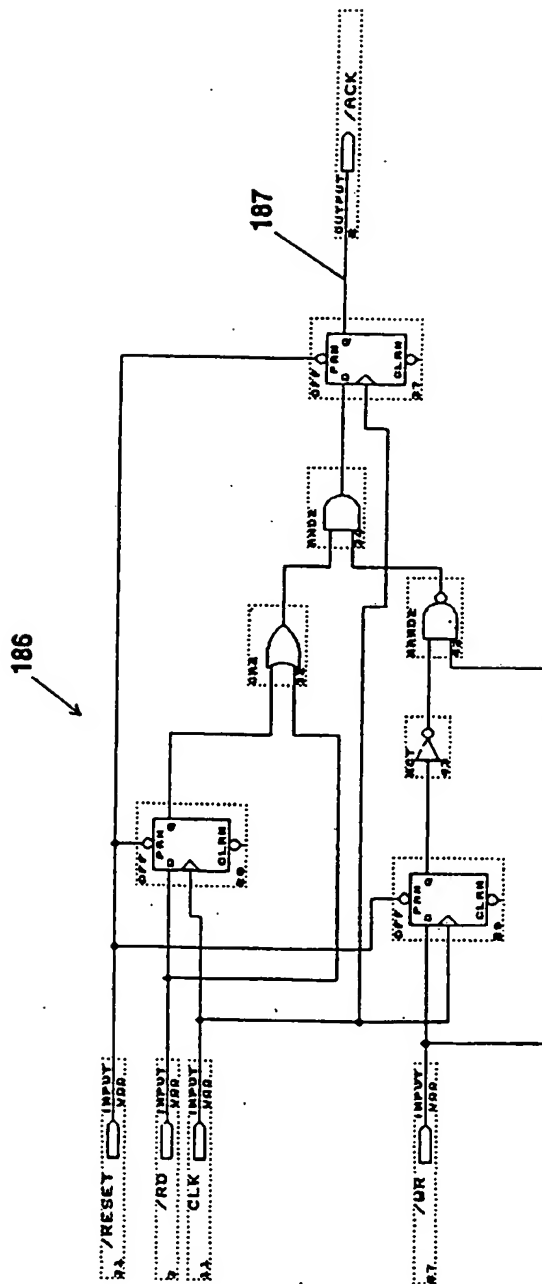
FIG 18

19/22
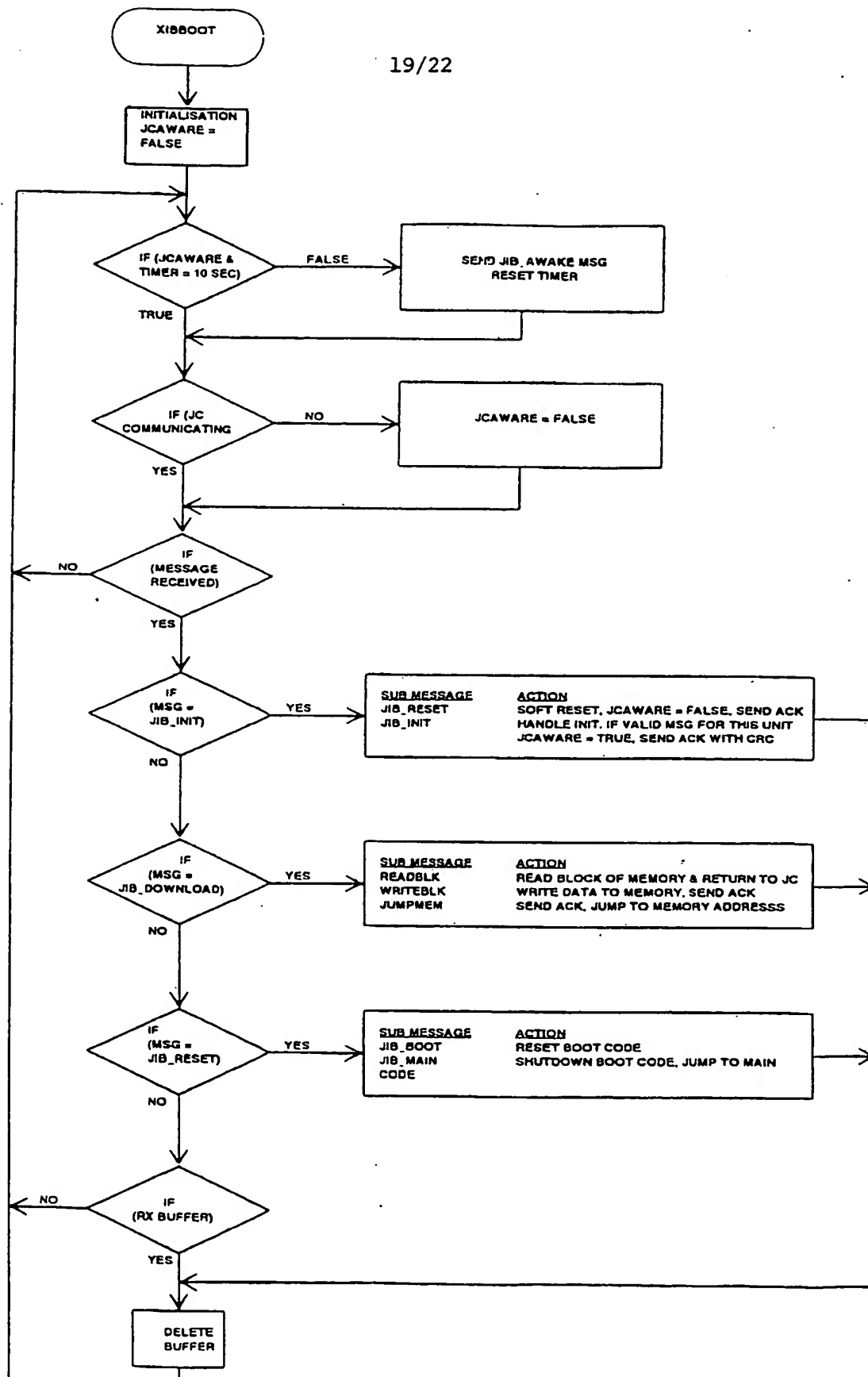
JACKPOT INTERFACE BOARD—BOOT LOADER

FIG 20

MESSAGING DIAGRAM

STEP	JCC	JC	ACTION
1			
	SELECT EGM		
2			PROVI. WIN MESSAGE DISPLAYED AT THE VENUE AND NEXT EGM IS SELECTED.
	WINNING EGM DETAILS		
3			
	WIN TICKET		
4			JACKPOT WON DISPLAYED AT THE VENUE
	JACKPOT WON		
5			PROVISIONAL WIN DISPLAYED AT ALL VENUES
	PROVISIONAL WIN		
6	JACKPOT WON		JACKPOT WON DISPLAYED AT ALL VENUES
	START NEXT JACKPOT		JACKPOT OPEN DISPLAYED AT ALL SITES

▷ :BOARDCAST TO ALL JC'S

FIG 21
SUBSTITUTE SHEET (RULE 26)
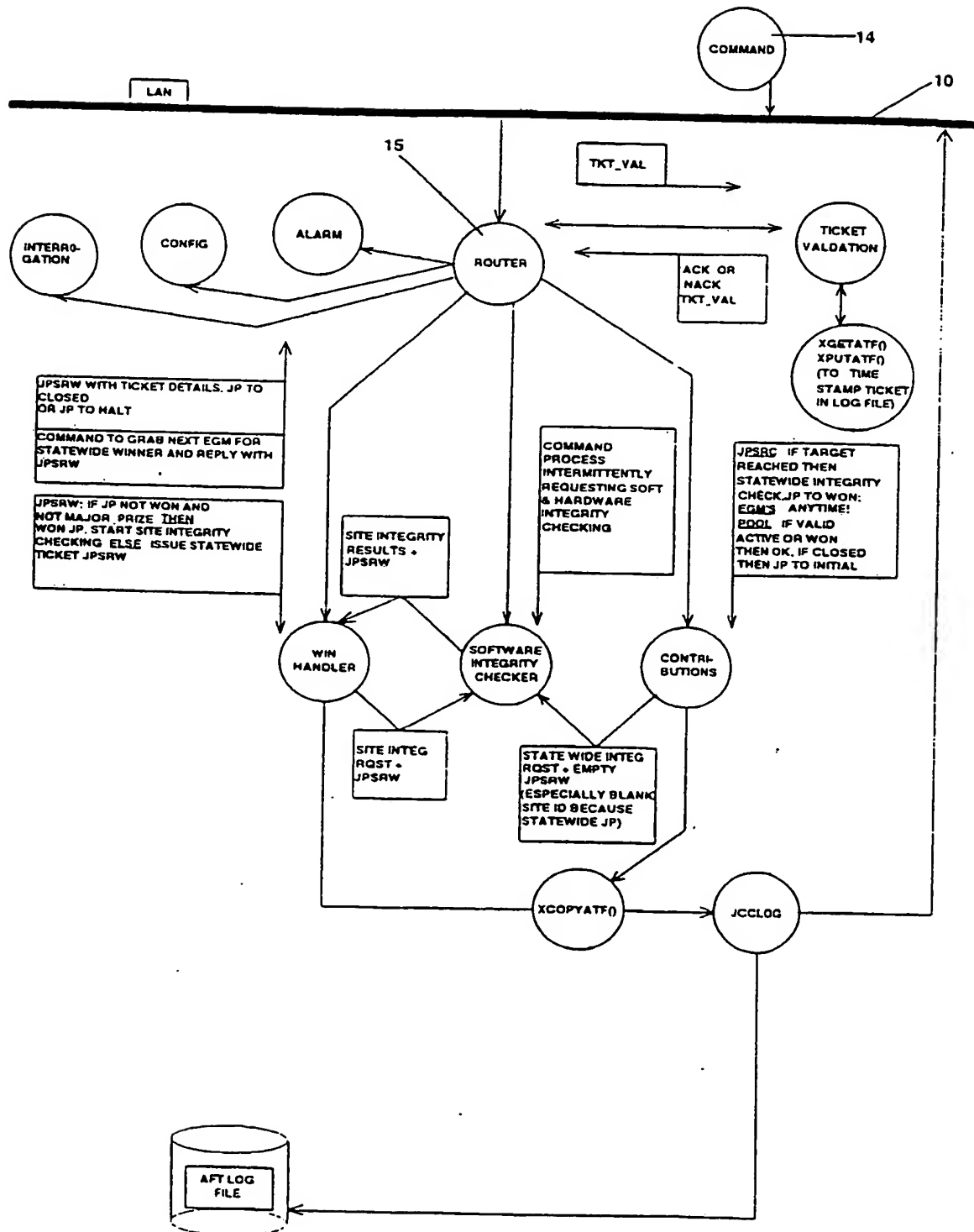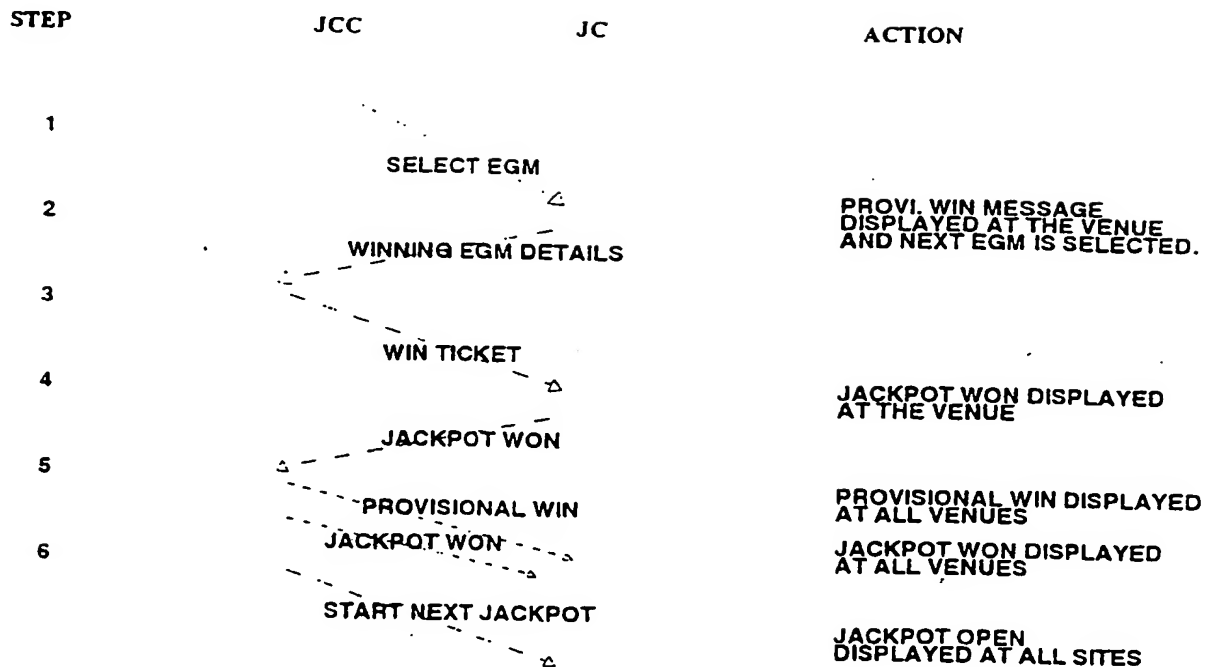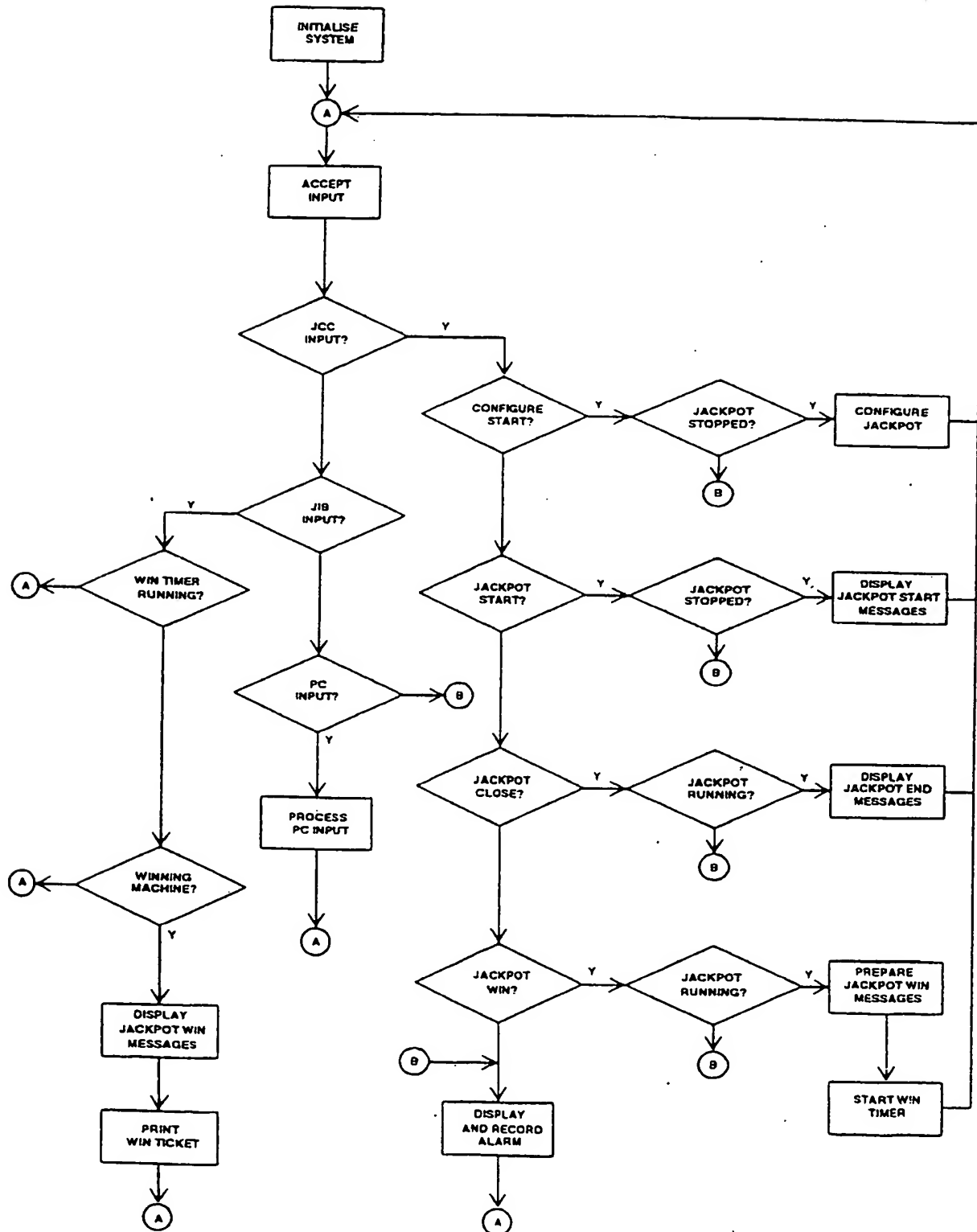
JACKPOT CONTROL LOGIC FLOW

FIG 22